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NOVEMBER, 1915

No. 263



THE SUGAR MAPLE

The American Forestry Association

Washington, D. C.

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IT IS A VOLUNTARY organization for the inculcation and spread of a forest policy on a scale adequate for our economic needs, and any person is eligible for membership.

IT IS INDEPENDENT, has no official connection with any Federal or State department or policy, and is devoted to a public service conducive to national prosperity.

IT ASSERTS THAT FORESTRY means the propagation and care of forests for the production of timber as a crop; protection of watersheds; utilization of non-agricultural soil; use of forests for public recreation.

IT DECLARES THAT FORESTRY is of immense importance to the people; that the census of 1913 shows our forests annually supply over one and a quarter billion dollars' worth of products; employ 735,000 people; pay \$367,000,000 in wages; cover 550,000,000 acres unsuited for agriculture; regulate the distribution of water; prevent erosion of lands; and are essential to the beauty of the country and the health of the nation.

IT RECOGNIZES THAT forestry is an industry limited by economic conditions; that private owners should be aided and encouraged by investigations, demonstrations, and educational work, since they cannot be expected to practice forestry at a financial loss; that Federal and State governments should undertake scientific forestry upon national and State forest reserves for the benefit of the public.

IT WILL DEVOTE its influence and educational facilities to the development of public thought and knowledge along these practical lines.

It Will Support These Policies

Federal Administration and Management of national forests; adequate appropriations for their care and management; Federal cooperation with the States, especially in forest fire protection.

State Activity by acquirement of forest lands; organization for fire protection; encouragement of forest planting by communal and private owners; non-political departmentally independent forest organization, with liberal appropriations for these purposes.

Federal Fire Protection by Federal, State and fire protective agencies, and its encouragement and extension, individually and by cooperation; without adequate fire protection all other measures for forest crop production will fail.

Forest Planting by Federal and State governments and long-lived corporations and acquirement of waste lands for this purpose; and also planting by private owners, where profitable, and encouragement of natural regeneration.

Forest Taxation Reforms removing unjust burdens from owners of growing timber.

Closer Utilization in logging and manufacturing without loss to owners; aid to lumbermen in achieving this.

Cutting of Mature Timber where and as the domestic market demands it, except on areas maintained for park or scenic purposes, and compensation of forest owners for loss suffered through protection of watersheds, or on behalf of any public interest.

Equal Protection to the lumber industry and to public interests in legislation affecting private timberland operations, recognizing that lumbering is as legitimate and necessary as the forests themselves.

Classification by experts of lands best suited for farming and those best suited for forestry; and liberal national and State appropriations for this work.

AMERICAN FORESTRY

The Magazine of the American Forestry Association

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November, 1915. Vol. 21

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THE DAY OF NO TIMBER

Is farther away now than the ultra-conservationists ten years ago said it was when they spread an alarm of exhausted supply.

TH E theory of exhaustion has been dismissed. Wood is still abundant. It is still and always will be the warm, friendly material that makes four walls a cosy cottage or a magnificent mansion. Our regard for it is inherent. Our children will continue to use it because its adaptability, beauty of finish and sound absorbing qualities give it a home-making charm that no other material possesses.

AND the uses of wood are multiplying phenomenally. We are just now coming to know its real values and save them. Practical by-product utilities that represent more than 60 per cent of the usable value of trees are now known, in addition to lumber which utilizes only one-third. Others will be found. With added use there is added worth.

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No. 263

The Sugar Maple

Identification and Characteristics

BY S. B. DETWILER

IF TREES had human characteristics, the sugar maple would be the banker of the forest community because of its store of wealth. It is a conservative, dignified, well-dressed tree, conscientious, hard-working and dependable. It loves the quiet life of the country, and has the air of belonging to "one of our best families," but it inspires affection as well as admiration.

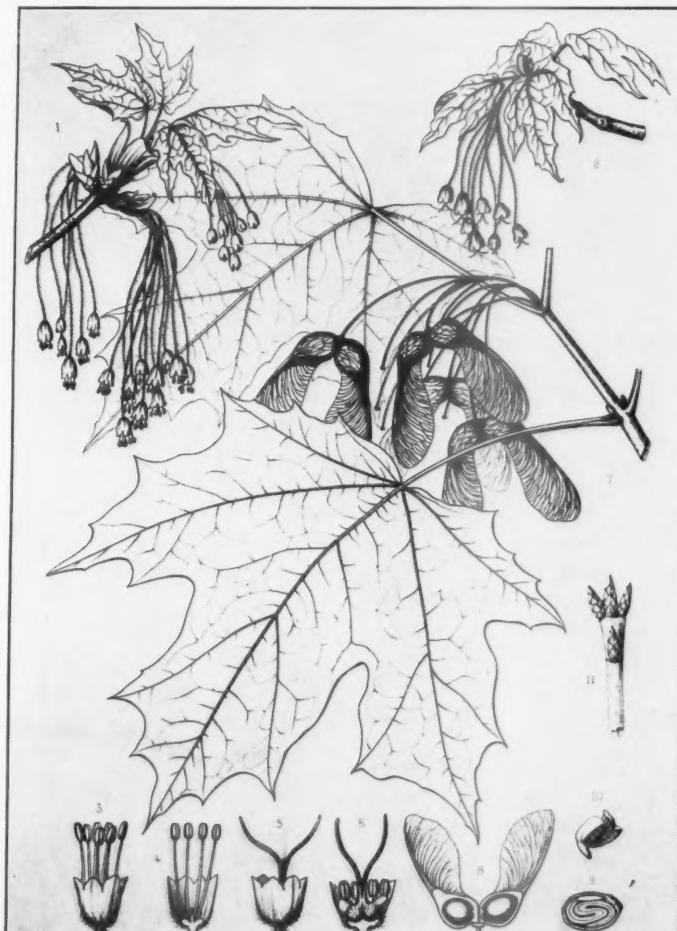
The maple family has about seventy members in the world, but sugar maple is by far the most valuable. It is widely distributed through eastern North America, from Newfoundland to Manitoba, and south to Florida and Texas. While sugar maple is the most familiar name, it is also well known as rock maple, hard maple and sugar tree. The black maple is an important variety found throughout the greater portion of its range. This form is not easily distinguished from the true sugar maple. In the south there are two other varieties known as white-bark maple and Florida maple. In the Rocky Mountain region, a near relative, the large-tooth maple, is found.

The finest and most abundant growth of the sugar maple is

found in the New England States, New York northern and western Pennsylvania and westward throughout the region of the Great Lakes to Minnesota. In the southern Appalachians it grows well where climatic conditions are similar to those further north.

Sugar maples growing in the open have a short trunk and a compact, well-shaped oval or oblong head. In the forest, its maximum size is about 5 feet in diameter and 120 feet in height. The usual forest maple is 2 to 3 feet in diameter, 70 to 90 feet high, clear of limbs to within 20 or 30 feet of the top, where it forms a small, rounded crown. The bark is usually ash gray, but may be a dark brown. On young trees the bark is smooth but in older trees it has deep furrows and is divided into broad plates or large, shaggy flakes. The bark has a peculiar hard, flinty appearance.

The leaves and buds stand opposite each other on the twigs. The leaves are shaped somewhat like the human hand, the edges being divided into five points or lobes. The deep notches between the points are broadly rounded and serve as an easy means of tell-



From "The Silva of North America," by Sargent; Houghton Mifflin Co., Publishers.

THE LEAVES, SEEDS AND FLOWERS OF THE SUGAR MAPLE

1. A branch with male flowers, natural size.
2. A branch with female flowers, natural size.
3. A male flower, enlarged.
4. Vertical section of a male flower, enlarged.
5. A female flower, enlarged.
6. Vertical section of a female flower, enlarged.
7. A fruiting branch, natural size.
8. Vertical section of a fruit, natural size.
9. Vertical section of a seed, enlarged, showing undeveloped embryo.
10. An embryo, greatly magnified.
11. A winter branchlet, natural size.



BARK OF THE SUGAR MAPLE

The bark is usually ashen gray, but may be a dark brown. On young trees it is smooth, but on older ones it has deep furrows and is divided into broad plates or large, shaggy flakes.

ing the sugar maple from the red and silver maples, in which the leaf notches are sharply cut and angular. The leaves are 3 to 5 inches long and of a slightly greater breadth; they are thin in texture, colored deep green on the upper surface and paler green underneath. The entire leaf margin is coarsely toothed.

The tree is as beautiful in winter as in summer. The branches trace a pleasing pattern against the sky. The twigs are slender, smooth and of a beautiful light brown color. The buds are sharp-pointed, conical, and about one-quarter inch long. The scales are small, dark brown or purplish in color, and overlap on the bud to form an attractive design. Unlike red and silver maples, which bloom early in the spring before the leaves come out, the sugar maple flowers appear with the leaves in April or May. The flowers that produce the pollen are in separate clusters from those which produce the fruit. Sometimes a tree bears only one kind of flower, but usually both appear on the same tree. They are small, greenish-yellow and are borne in clusters on thread-like stems about $2\frac{1}{2}$ inches long.

The fruit of the sugar maple is winged, two being joined together to form the familiar maple key. Usually only one fruit of the key is perfect and will grow; if this is carefully opened, the baby tree may be plainly seen. The clusters of keys are usually found at the tips of the twigs and often remain on the tree over winter. In this respect, sugar maple differs from the red and silver maples, whose fruits usually appear on the sides

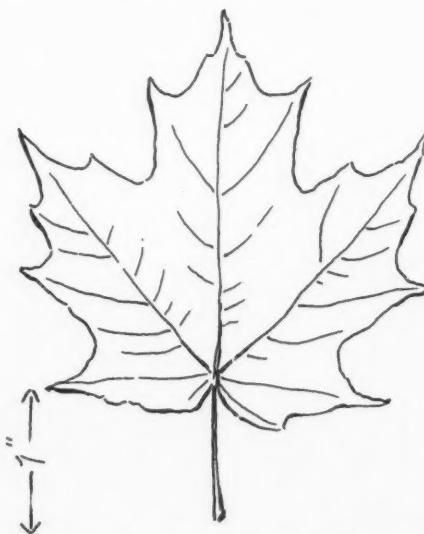
of the branches, ripen early in the summer and fall quickly. The wings on the fruit serve as an aeroplane to carry the seeds to a considerable distance from the parent tree. The heavy end falls first, and, if the keys split apart, the shape of the wing causes the fruit to revolve rapidly and work its way through the grass and débris to the moist ground where it can germinate.

The wood of the sugar maple is hard, heavy, fine-grained and strong. It has a satiny surface which takes a high polish. The sap wood is white or cream color and the heart is various shades of light brown. The sugar maple is one of our most valuable broad-leaved timber trees. The wood is easily split and is one of our best fuel woods, it is also one of the principal woods distilled for producing wood alcohol and acetic acid.

The wood is not naturally durable in contact with soil, but when it is creosoted, it makes excellent railroad ties and fence posts. When burned, its ashes yield large quantities of potash which are leached for soap making and other uses. The ashes are also valued highly for fertilizing purposes, especially for lawns and orchards.

Curly maple is caused by a twisted grain which gives a beautiful pattern to the wood. Bird's-eye maple is due to the growth of great numbers of buds in the thick bark, or, in some cases, it may be caused by the holes drilled by woodpeckers in quest of the sweet sap. At any rate, the wood has unusual markings, and, like curly maple, it is much in demand for furniture and cabinet making, logs bringing about \$90 per thousand feet, board measure.

Acer, the scientific name of the maple family, means hard or sharp. It was applied because the wood of some kinds of maples is extremely hard and was greatly esteemed by the ancients for making pikes and lances. The Romans prized maple wood very highly, and tables inlaid with curious portions of it in some instances brought their weight in gold. Virgil celebrates the maple as the throne on which Evander seated Aeneas.



LEAF OF THE SUGAR MAPLE

Shaped somewhat like a human hand, the leaf is readily identified. The edges are divided into five points or lobes. The leaves are three to five inches long, thin in texture and colored deep green on the upper surface and pale green beneath.



FOREST FORM OF SUGAR MAPLE

The maximum size of the forest trees is about five feet in diameter and one hundred and twenty feet high. The usual forest maple is from two to three feet in diameter and seventy to ninety feet high, being clear of limbs to within twenty or thirty feet of the top, where it forms a small rounded crown.

"On sods of turf he sat the soldiers round;
A maple throne, raised high above the ground,
Received the Trojan chief; and, o'er the bed,
A lion's shaggy hide for ornament they spread."

The sugar maple flourishes on moderately deep, well-drained, fertile loam soils. It will grow on stiff clay soils if not too wet, and on stony hillsides if not too dry; it shows strong preference for limestone soils. It thrives in cool, moist situations; in fact, sugar maple requires a cool climate and an abundant rainfall for its best development. It has a shallow root system. Under the best conditions it grows only moderately fast. In the forest it grows slowly, but at a fairly even rate; an inch in diameter in 12 to 16 years is probably average growth under forest conditions. In the Lake region, beech and yellow birch are commonly found associated with the sugar maple. Among other trees that often grow with it are red spruce, paper birch, red maple, white pine and hemlock.

The exceptionally dense foliage of the sugar maple enables it to endure heavy shading by other trees. Some seed is borne every year, but every three to five years large quantities of seed are produced. For this reason young growth is abundant, and the ability of the seed-

lings to grow vigorously in considerable shade insures plenty of young maples ready to take advantage of any opening in the forest. Sometimes trees develop from the sprouts that come up from maple stumps on cut-over lands.

If it is desired to grow sugar maple trees, the seed should be planted in the fall in well-prepared seed beds. The seeds may also be sown in spots cleared of grass and shrubbery where the trees are desired to stand permanently.

Sugar maple is an excellent shade tree for planting along country roads and village streets. In large towns, it is affected by smoke, dust, illuminating gas and other troubles. It is sometimes defoliated by the forest tent caterpillar, and the maple borer occasionally makes great holes in its trunk. Under favorable conditions the tree may live to reach an age of three or four hundred years.

The sugar maple casts a very dense shade, and the mosaic formed by the artistic arrangement of leaves on the branches is a joy to the observant student of nature. Its broad dome forms a pleasing picture in summer or winter, but the lover of the woods finds one of his greatest pleasures in its brilliant autumn foliage. At first the change of color is gradual; later the tints become more and more



SUGAR MAPLES AS STREET TREES

This variety of maple is popular as a shade tree. It thrives best in villages or along country roads, as in large towns it is affected by smoke, dust and gas. It is subject to attack by the forest tent caterpillar and the maple borer occasionally makes great holes in its trunk.

gorgeous. The glowing shades of yellow, orange, scarlet and green turn the forest landscape into a wondrous sea of color.

The "sugar tree" is an appropriate name, for in a cool climate this tree stores great quantities of sugar in its sap. The colder the season the larger the amount of sugar it yields. In March, when the sap is ascending, the trees are tapped and the sap is collected and evaporated into maple syrup and sugar. Unless excessive, tapping does not injure the tree and can be continued indefinitely. Sugar "bushes" or orchards are profitable when well cared for. Three or four gallons of sap are usually required to make one pound of sugar. Two or three pounds of sugar per tree is an average yield. Large, solitary trees often yield much more than this.

Commercial Uses of Sugar Maple

BY HU MAXWELL

COMPARATIVELY little maple lumber is used in rough form. It is essentially a factory wood, and as such it has a place in nearly every industry of this country which employs wood as raw material. The reported sawmill production of maple lumber for the United States in 1912 was 1,020,864,000 feet, and the factory use for one year is reported at 922,337,274 feet, which is 90 per cent of the cut of the mills.

Maple appears in fifty of the fifty-five industries into which the uses of wood in the United States are generally divided. No other wood has a record so nearly approaching universal use. Oak, red gum, basswood and birch approach maple, but fall a little short. It appears in a few industries where they are not found. As might be expected, Michigan, which produces more maple lumber than any other state, is likewise the largest user of this wood in its factories.

MANUFACTURING

Maple is pre-eminently a manufacturer's wood. Little rough lumber reaches the final user, but it passes through machines or is shaped by tools until it has been fitted for the most exacting service required of wood. Nearly every industry that has a place for any sort of wood, draws supplies from maple. It fills positions where the highest order of material is required, and it meets de-

mand if low-class and cheap stock suffices. It is an associate of aristocrats and a companion of plebeians. Forty-nine wood-using industries report it as raw material for further manufacture in various parts of the United States. The largest consumes more than 300,000,000 feet a year; the smallest less than 25,000. The ten industries which lead in the use of maple are: planing mill products, furniture, boxes and crates, boat and shoe findings, agricultural implements, musical instruments, handles, woodenware, vehicles, fixtures. These use a total of about 833,000,000 feet yearly, while the use of maple by thirty-nine other industries aggregates 89,124,587 feet a year, and forty states report it. This is in addition to what is consumed for cooperage, wood distillation and fuel, and in the aggregate these amounts are very large.

PLANING MILL PRODUCTS

The largest demand for maple comes from the industry which turns out planing mill products. These cover a considerable range of articles, among which are flooring, ceiling, wainscoting, stairwork, molding, doors, and many other articles of interior house finish. The largest single item is flooring, so far as the use of maple is concerned. No wood surpasses it for that purpose,

in point of long service and the ease with which it can be kept in repair. Though its natural color is very light, it readily receives stains and almost every shade desired can be developed, but most users prefer the natural color, which may be given an oil finish.

The excessive hardness of maple adds greatly to its value as flooring. Tests conducted under exactly similar conditions have shown that a maple floor may outlast one of marble, under very heavy wear. After the wood has been well seasoned, it shrinks and swells but little under atmospheric changes and this increases its value as floor material. A maple floor remains smooth and its joints are tight and sanitary. The absence of alternate hard and soft streaks causes uniform wear, and as long as such a floor remains, it is attractive. Maple flooring has a market which not only reaches every part of the United States, but extends to many foreign countries. It is bought by the builders of small cottages and is specified by architects for hotels, apartments and large business blocks.

Stair builders find this wood one of the best to be had, and the demand for it is extensive. It serves not only as stair treads where the wearing is most severe, but it is frequently worked into every part of stair work, and is specially suited for rails and balusters.

Maple shows to excellent advantage in wainscoting where panels are employed. The bird's-eye and curly stocks are seen at their best in work of that kind. It is not unusual to employ rotary-cut veneer in building such panels. This veneer differs from that which is sliced or sawed by being peeled round and round the log as a broad, thin ribbon. By this method the bird's-eye effect is brought out in the best possible manner, and many sheets of veneer almost exactly the same in figure are obtained. Such are bundled and a purchaser may buy enough of certain figure to finish an entire room, or even several rooms. The sheets of veneer are little thicker than writing paper, and a single figured log may produce two or three thousand square feet of bird's-eye

stock so nearly the same in appearance that the closest scrutiny is required to discover the slightest difference.

Veneers of high class are used only as surface finish where they are exposed to view. They are glued upon cores or backing of other and cheaper woods. A beautiful wainscot panel in which bird's-eye stock only is visible, may really have the thinnest covering of maple, while the hidden parts consist of pine, chestnut or some other wood which possesses the requisite glue-holding qualities.

The manufacture of maple doors has become a large business, and they consume some of the choicest output of sawmills and veneer factories. The workman here finds his opportunity to display his best skill. Maple doors are often real works of art, though they may contain no figured wood. The very plainness of maple is sometimes accentuated as its principal recommendation. Doors are usually veneered; at least, those of highest grade are. The process does not differ from that employed in making wainscot panels. The best doors are

built up of many parts which are held together by glue and dowels. The latter are small wooden pins, varying in size according to the use intended. They take the place of nails and screws, and are so skillfully inserted that they are wholly invisible in the finished door. Several dozen may be concealed within the joinings of a single door. Dowels are often maple, but other woods are used.

FURNITURE

The second largest demand for maple lumber comes from furniture factories. The making of chairs is often classed as an industry distinct from other kinds of furniture, because the two commodities are frequently the product of separate factories and of different methods; but no useful purpose is served in the present instance by separating them.

No wood is more popular than maple where light-colored furniture is wanted. Not only is the wood's natural color very light, but when enameling is desired, maple ranks among the highest woods procur-



SUGAR MAPLE TREES IN WINTER
The formation of the branches may best be studied in winter, and the student should be able to identify it as readily then as in the summer.

able. Its surface takes the smoothest, finest polish, and enamel adheres to it perfectly. This is true also when goldleaf finish is designed, in work of very high grade. Most maple furniture, however, is finished in the wood's natural color. Curly, wavy, smoked, cloudy and bird's-eye effects are brought out to fine advantage. Maple darkens and the tones grow richer with age, though the actual outlines of the figures may lose something of their distinctness.

Those who consider chair making separate from furniture manufacture, accord maple a high place. The majority of chairs made in separate factories or mills are of common patterns and medium prices. They are primarily for use, while the high-priced chairs that come from furniture factories are often designed primarily for ornament.

One of the first requisites of a common chair is that it shall be strong. Only handles and vehicles call for stronger woods than chairs, and the difference is only slight. Maple ranks among the very strongest of American woods, and for that reason it occupies a commanding position among chair stock materials. This stock is usually worked out by small, portable mills, equipped with special machinery. They move from site to site, frequently cleaning up the slashings left by hardwood

is shipped to central factories to be finished and assembled, and to be turned out as completed chairs.

BOXES AND CRATES

The making of shipping boxes and crates constitutes the third largest demand by manufacturers upon the maple supply. The wood possesses two qualities which are not considered favorably by box makers—hardness and weight—but in spite of these, it is consumed in enormous quantities by box factories. Hardness is a disadvantage from the nailers' viewpoint, while the purchaser of commodities shipped in boxes has reason to object to excessive weight on which freight must be paid at the same rate as on the merchandise within. But these drawbacks are more than compensated for by the good points of maple box lumber. It is so strong and stiff that the lumber may be cut thin, thereby making a given quantity go farther. It is a clean wood, which is a point insisted on by many purchasers of boxes that carry articles of food. The wood contains no stains or odors to contaminate the contents. Though it is heavy, yet by cutting it thin, a smaller amount of material is needed for a box of given size than might be required if a lighter, weaker wood were chosen, consequently, the cost may be less.

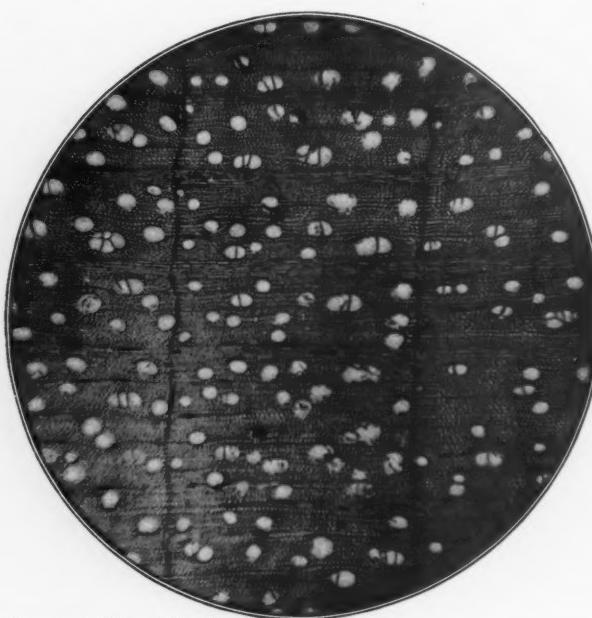


Courtesy the Manual Arts Press.

AREA OF SUGAR MAPLE GROWTH

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The bulk of maple box lumber comes from the culls and low grades of maple sawmills; and the largest use is found in regions near where the maple output of lumber is largest. More than one-half of all the maple box lumber used in the United States is reported by box makers in Michigan and Illinois, and the latter State draws the principal supply of that wood from Michigan. It is probable that fully one-half of all the maple box lumber consumed in the United States grows in Michigan. The industry affords a market for much low-grade maple lumber which might not otherwise find buyers. It holds true of this wood, as of all others, that high grades sell readily, while the low grades are often hard to dispose of. A reason commonly assigned for that condition is that the low grades cannot pay freight charges necessary to reach distant markets.



Courtesy the Manual Arts Press.

MAGNIFIED CROSS-SECTION OF SUGAR MAPLE

Showing one complete annual ring, included between the two dark lines, and parts of two other annual rings. The small openings are pores or vessels. Faint lines running at right angles to annual rings are pith rays.

sawmills; because chair mills utilize logs and bolts, crooked and short lengths, which the sawmill is obliged to leave in the woods. In the northern hardwoods, and wherever maple grows, the chair mill finds it a valuable pick-up after the sawmill has cut the large, smooth logs, and moved on. The dimension stock, for rounds, spindles and braces, which the chair mill roughs out,

BOOT AND SHOE FINDINGS

Maple leads all other woods of the United States in the industry which produces boot and shoe findings. Lasts are the most important article of this industry, so far as such are supplied by wood; but some maple is consumed in the production of shoe pegs and shanks, though paper birch is ahead of maple in all except lasts. In the manufacture of these, maple has no rival worthy of mention. It is so much superior to them all that it stands alone. A very hard, close-grained wood is demanded, and the most exacting processes of seasoning are necessary to fit it for the place it must fill.

Last blocks, which are the rough billets, are partly shaped without the use of the lathe. Choice, straight-grained trunks are first cross-cut into bolts which are usually long enough for three lasts. The bolts are split into billets of proper size, and these are carefully air-seasoned from one to three years. Because of the slowness of the drying, few checks or cracks open in the wood. If such do open, the rigid inspection rejects them, for the smallest crack degrades or spoils a last. After air-seasoning has been sufficient, the billets are subjected to kiln heat for a considerable time. They are then cut into lengths proper for one last each, and are passed through a lathe which produces the rough form only.

The actual turning of the last is a careful and delicate operation. An automatic lathe does it. The keen knives, each revolving at very high speed, dig into and chip away the wood, scooping out depressions here, and leaving elevations there, until a last, which must be the exact shape of the inside of a shoe, is produced. The knives are guided by cams which slowly feel out the precise form of a pattern affixed to the lathe as a guide. Every change in style of shoes calls for new lasts and the old, though they may still be perfectly serviceable from a mechanical standpoint, go to the scrap pile, victims of changing fashions in footwear. For that reason, shoe last factories must always keep ample supplies of rough last blocks on hand; but they must not manufacture much ahead of the orders on file.

AGRICULTURAL IMPLEMENTS

The manufacturers of agricultural implements require the enormous quantity of 321,000,000 feet of various woods annually. Some other species are in more demand than maple, but it is near the head of the list and furnishes 15 per cent of the total. In almost every case it is selected on account of its strength, hardness and stiffness. It is pre-eminently a frame material when machines are of considerable size; but it has a place also as pitmans, guides, levers, braces and axles. Its largest use is found in threshers, reapers, fertilizer spreaders, grain drills, wind-stackers, land rollers, fanning mills and similar machines. When maple is employed as slides in apparatus with rapid oscillating motions, the wood wears to the smoothness of polished steel and friction is reduced to a minimum.

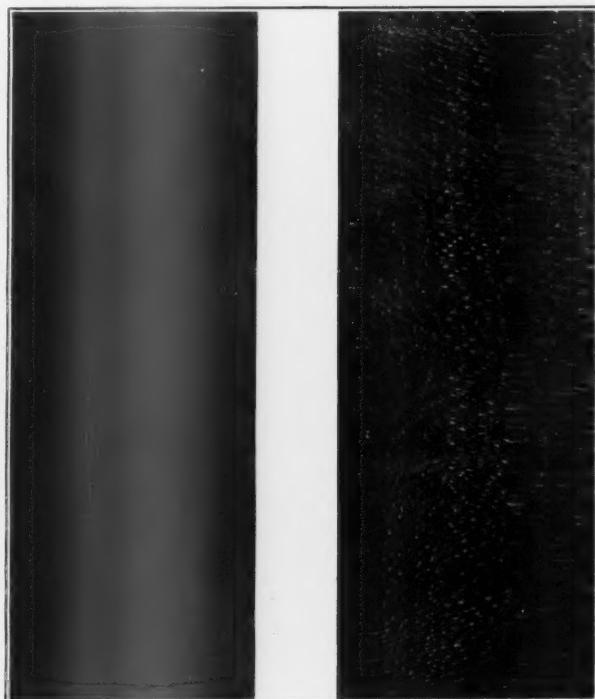
Maple is much used for hoppers, chutes, drawers and boxes which are essential parts of certain classes of agricultural implements; but when so used it possesses

no advantage over yellow poplar and cottonwood, since great strength is not demanded.

MUSICAL INSTRUMENTS

Few persons who have not looked into statistics of the uses of woods in the country's industries would place maple as the leading one in the manufacture of musical instruments in the United States, yet such it is. A large number of woods, both foreign and domestic, have places in that industry. It calls for materials of the highest class. The annual demand exceeds 260,000,000 feet, and 18 per cent of it is maple.

It may be used for practically every part of a piano that can be made of wood, except the sounding board, which is always spruce; but maple's most important place in piano making is in the actions. It is so peculiarly fitted for the requirements of that mechanism that it monopo-



Courtesy the Manual Arts Press.

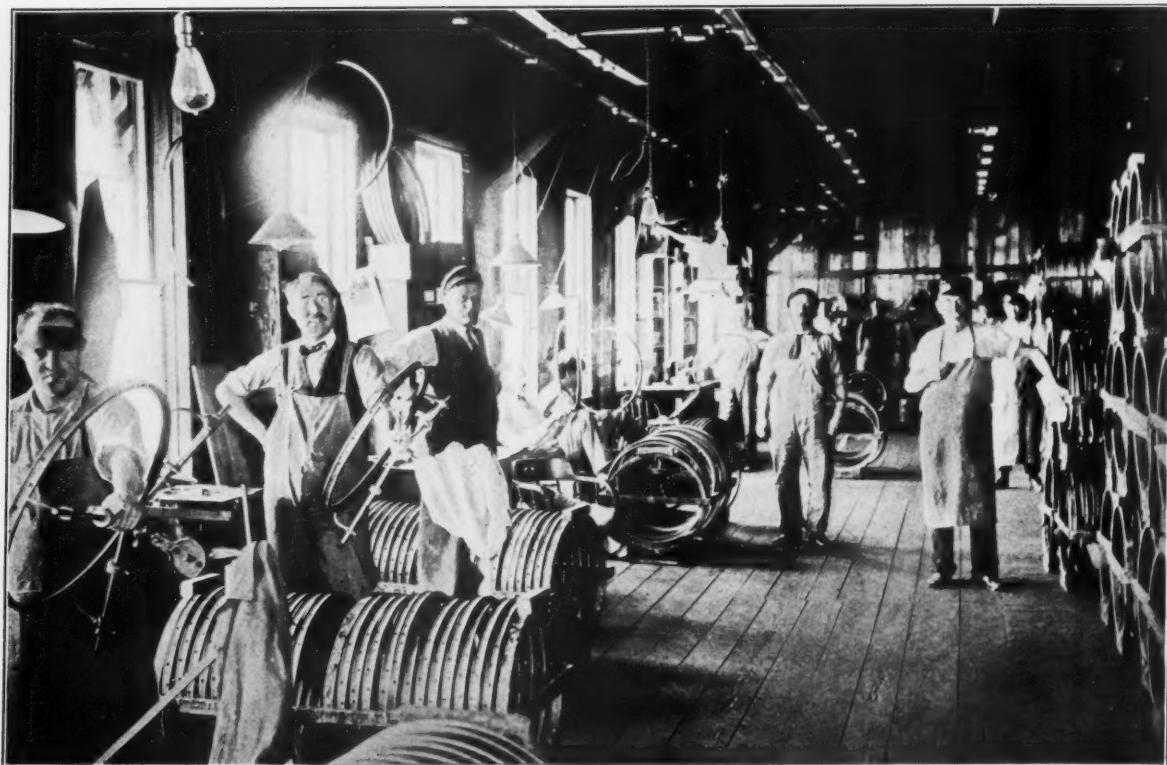
SUGAR MAPLE BOARDS

Tangential or bastard cut, the most common method of sawing.

Radial or quartersawed section, showing pith rays, which appear in cut as light flecks or streaks.

lizes it in many factories. Again it is maple's hardness, stiffness and strength that lead to the preference shown it; but its fitness for piano actions is due likewise to what is known as "standing qualities." That term means, when applied to a wood, that it will hold its form in climatic changes, neither warping, shrinking nor swelling. Maple is not surpassed in that quality, at least not among commercial American woods.

Some of the choicest figured maple finds its use as piano cases, and as the boxes or cases of phonographs and the bodies of costly harps; while the very finest of all, though in small quantities, is found in the sides of violins. The artist who exercises his skill in the making



SUGAR MAPLE MUCH USED FOR WHEEL RIMS

Bicycle and sulky wheel rims made of sugar maple. Ninety per cent of the wood used for this purpose is of this species.

of this instrument considers the stick of curly or smoky maple, which reaches his hands as raw material, the fittest medium for the display of his genius and for the interpretation of his ideas.

WOODENWARE

The term woodenware is very broad, and its boundaries are vaguely defined. It includes most everything made of wood which does not specifically belong somewhere else. It is commonly understood to include wooden supplies and apparatus used by beekeepers, poultry raisers and dairymen, and also nearly all sorts of wooden novelties. More than 38,000,000 feet of maple reaches its final use yearly as woodenware in the United States. It is impracticable to name even by classes, the articles which owe their existence to this remarkable wood; but one of the smallest, and at the same time the most ephemeral, is doubtless the most important.

This is the picnic platter. It is a thin, wooden plate with which nearly every one is familiar. Its uses are many, but all are temporary. It is expected to serve only once, and for that once the grocer may sell butter in it, the butcher may wrap sausage in it, the baker's pie is carried in it to the customer, the picnicker may serve his forest-cooked dinner on it by some mountain stream. It is then thrown aside, and a new one takes its place next day.

There are no statistics showing the number of such plates manufactured, but they are numbered by millions, and maple furnishes a large part of the material.

Beech and birch supply nearly all the rest. Maple logs of the finest quality pass through machines and come out ready for the user. The first step in the process is to peel the log in long, broad ribbons of veneer, by the same method as the veneer is cut that goes to the furniture maker. The veneer is steamed, cut in discs and pressed in shape; and the work is done.

Maple contributes largely to kitchen and pantry ware, like vegetable cutters, stompers, pastry boards, rolling pins and carved trays and dishes. It is a choice wood for such wares because of its sanitary qualities. It is easily kept clean. The surface remains smooth because it is so hard that it will not readily dent or bruise.

MISCELLANEOUS

The principal places filled by maple in vehicle making are as axles for heavy wagons, runners and frames for sleds and sleighs and frames for bodies of buggies, carriages and automobiles. As an axle wood it is stronger than oak and compares favorably with hickory; but if subjected to pressure beyond its ability to sustain, or if caught by a sudden jolt or jar, it is liable to snap much more suddenly than oak or hickory. It is more brittle than they, and if it breaks, it breaks suddenly and without warning in the way of preliminary bending. Forty-nine woods are reported in the vehicle industry, and only four in larger amounts than maple. They are hickory, oak, yellow poplar and ash.

The employment of maple in making fixtures for

stores and offices follows the same general lines as in furniture and interior house finish; that is, either as frames or as surface finish, usually as veneer. Figured stock is in demand. The class of fixtures in which most maple is employed includes counters for banks, stores and libraries; cabinets for stores and ticket offices and standing desks, stationary seats and partitions for offices and banks. Rostrums for schools, halls and lodge rooms are often built largely of this wood.

Laundry appliances constitute an important demand. The drying rack for clothes is an important article, and the frame in which curtains are stretched is another. Maple's strength is responsible for the employment of the wood in laundry machinery, and mangles, by which clothes are smoothed, are made of it because of its hardness and its smooth finish. Most clothespins are of beech, yet large numbers are maple.

Textile mills where three-piece spools are in use depend to a considerable extent on maple for these articles. The ends are often maple, but the central barrel is more often basswood or yellow poplar. The small, one-piece spool



SOME OTHER USES OF SUGAR MAPLE

Products cut from beech and maple for paint brushes and cheap shaving brushes. Photo from the Fred B. Pierce Company, Keene, Cheshire County, New Hampshire.

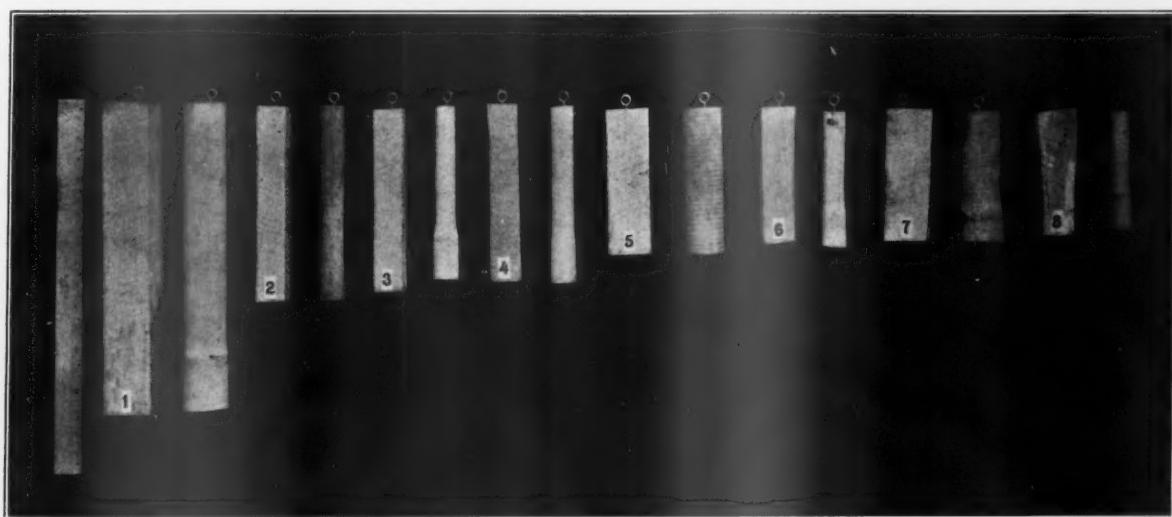
is paper birch.

Manufacturers of refrigerators and kitchen cabinets in which ice or other cooling appliances are employed, consume more than 6,000,000 feet of maple yearly for frames, inside lining, doors, shelves and exterior finish.

Nearly an equal amount goes annually into the con-

struction of cars where it serves in numerous capacities. Stock with fine figure, generally veneer, appears as exterior finish for coaches, but most of the maple that goes to car shops is utilized as frames and other hidden parts.

It would scarcely be supposed that 5,000,000 feet of maple are consumed yearly by makers of trunks, yet statistics show that such is the case. Some of it appears as slats placed on the outside of the trunk to strengthen it; some forms trays and compartments within; and rotary-cut veneer is made into three-ply sheets and bent in the necessary shape to form the body or box of the trunk, which is then covered with canvas, leather or metal. Maple is only one of several woods so used, and in quantity is exceeded by basswood, yellow pine, white pine, hemlock and elm, while eighteen woods are reported in smaller amounts by trunk makers.



READY TO BE TURNED INTO BOBBINS

In the manufacture of bobbins for use in textile mills woods which turn readily are desired. Sugar maple contributes about equally with beech and birch the raw material required for this purpose.

Factories which produce sporting and athletic goods consume nearly 5,000,000 feet of maple annually in articles of many classes. Bowling alleys and the accompanying apparatus account for most of it. The bowling pins made of maple are considered superior to those of any other American wood. Its hardness and elasticity cause it to be preferred to any other. The pins withstand excessive battering. The same qualities lead to its use as croquet balls and mallets.

Two woods only, hickory and ash, are in more demand than maple by handle makers. The chief call for hickory comes from the manufacturers of slender handles where excessive toughness and resiliency are wanted; ash leads other woods for farm tool handles, as rakes, hoes and pitchforks; and maple supplies many of the remaining handles, among the numerous kinds being handles for brooms, brushes, mops, small hand tools and what are called grips, or the small turned pieces of wood serving as hand holds on pails, tubs, boxes and packages. Many

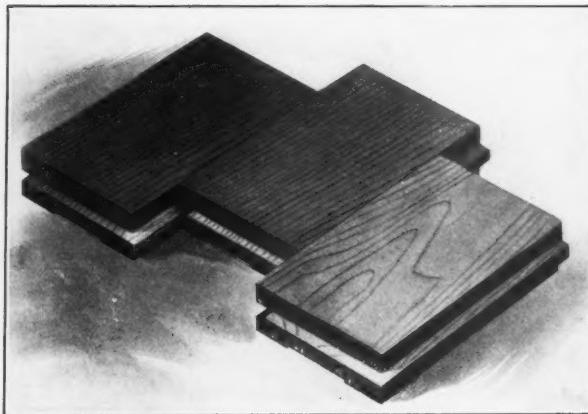


Photo by Maple Flooring Manufacturers' Assn.

SUGAR MAPLE FOR FLOORING

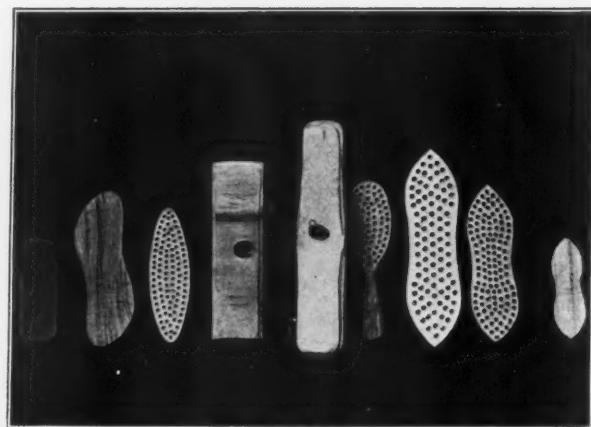
It is particularly serviceable for this purpose, the wood being tough, heavy, strong and hard, taking a high polish and wearing evenly.

pail handles are enameled to give them the appearance of black ebony, and maple is one of the best woods for that treatment.

This wood has been found well suited for various parts of professional and scientific instruments, and nearly four and a half million feet are so used yearly. With the exception of southern red cedar, maple leads all other species in that industry, though thirty-four are reported.

Nearly four million feet of maple go yearly to toy factories in this country. The separate articles are very numerous, but most of the maple is worked into wagons and sleds for children, and into toy tools for the playground.

Excelsior mills convert 3,000,000 feet of maple yearly into the finely-cut ribbons of wood, and the finished article is of great value as packing material for merchandise. It takes the place of straw for that purpose, and is better because it has a firmer body and is more elastic. Excelsior is employed in considerable quantities in upholstery, but is not equal to cotton, hair and Spanish moss.



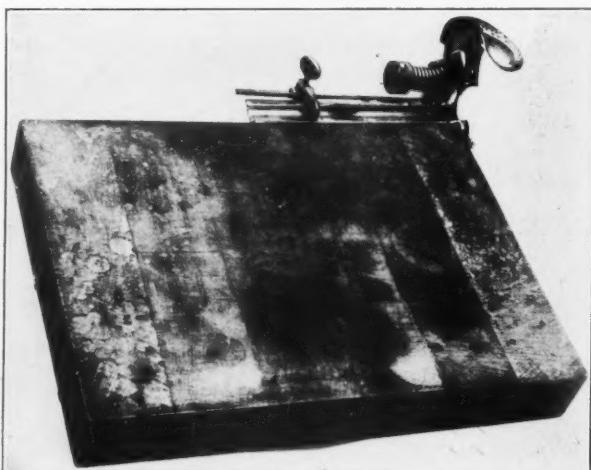
USED FOR BRUSHES

Sugar maple supplies a large part of the raw material required in the manufacture of high-grade brushes of various kinds.

The chopping blocks on which butchers cut meat were once made of sycamore almost exclusively, but maple has now taken first place. The chopping blocks are built up of sections bolted together, but the old-time sycamore was in a single piece. Maple is a leading wood also for skewers, which are the small pins or pegs with which the butcher trusses up a roast. The skewer maker selects a wood that is not inclined to splinter, and maple meets that requirement.

A number of industries consume maple in relatively small amounts, that is, less than 2,000,000 feet a year. Among such are the following:

Brush backs require a wood firm enough to retain the bristles, corn or fiber, and the yearly use of maple totals 1,912,000 feet. Of the thirty-four woods contributing to this industry, beech and birch alone exceed maple in quantity.



SUGAR MAPLE FOR CUTTING BLOCKS

For cutting blocks, including those used in cigar factories, butcher shops, etc., sugar maple is employed in equal quantities with sycamore. Formerly a solid block of wood was used for small cutting blocks, like those shown in the picture, while a two-foot section of a tree answered the same purpose in the butcher shop. At the present time both kinds of blocks are built up of a number of smaller pieces, glued and bolted together.



WELL PILED MICHIGAN MAPLE LUMBER

Much of the mill man's success depends on the way his lumber is stacked in the yard. It should season flat and straight. It will then pass through the machines with the minimum of waste.

The makers of pumps and wooden pipe for conducting water or other liquids require 1,706,000 feet of maple annually.

Elevator makers report 1,652,000 feet. It is worked into guides and floors.

Nearly one and a half million feet go into saddles and harness, chiefly as hames and as trees or frames for saddles.

The pins or dowels which serve to fasten together the different parts of doors, furniture, interior finish and fixtures call for 1,354,000 feet of maple a year.

Toothpicks account for 1,200,000 feet, but paper birch greatly exceeds maple as toothpick material. The log is first reduced to veneer of proper thickness and is then sliced into picks.

The consumption of more than a million feet of maple a year is reported by manufacturers of electrical machinery and apparatus.

Whip handles, canes and umbrella handles call for more than a million feet.

A like quantity finds its way to boat yards as material for construction of vessels of all sizes. Most of it is used as trim.

The making of mine machinery and other appliances and equipment draws liberally upon maple.

Approximately 870,000 feet a year go to factories which make shade and map rollers, and most of it is

converted into the small plugs to which are fastened the springs that by uncoiling raise the shades. Most of the rollers are white pine.

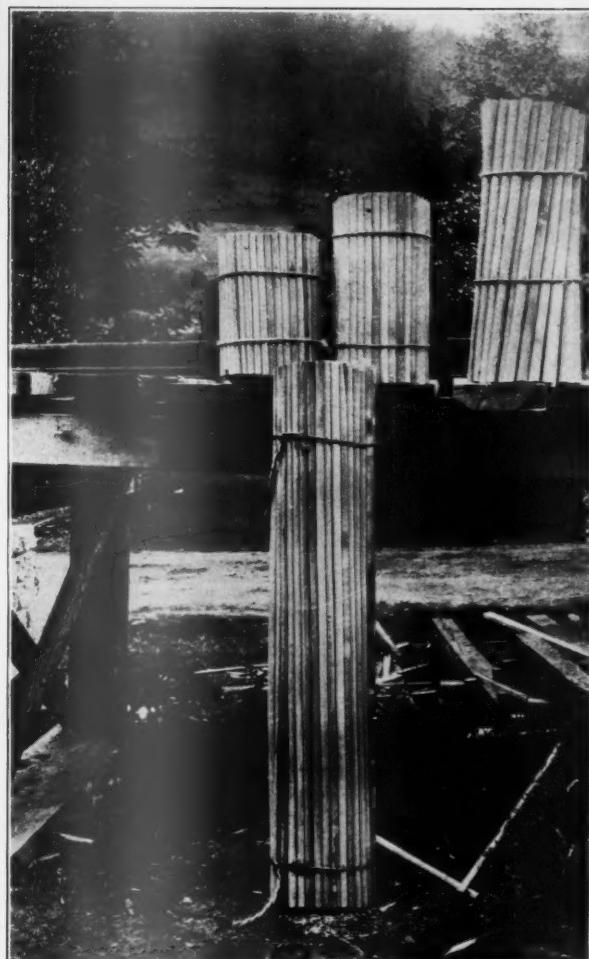
Considerably more than three-quarters of a million feet of maple a year is manufactured into faucets and bungs for barrels and kegs.

Nearly an equal quantity is consumed in making the numerous articles and apparatus classed as playground equipment. Other uses are for printing material, brooms and carpet sweepers, weighing apparatus, plumbers' woodwork, sewing machines, picture frames, silos and tanks, artificial limbs (crutches), gates and fencing, patterns and foundry flasks, caskets and coffins, advertising signs, clocks, cigar boxes.

In the State of New York 130 separate uses of maple are reported by factories, 164 in Illinois, 168 in Michigan and 336 in Pennsylvania.

SLACK COOPERAGE

Cooperage or stave ware is divided in two classes, called slack and tight. The latter term is applied to barrels intended to hold liquids, while stave containers



HANDLES OF SUGAR MAPLE

Mop and broom handles are made usually from three varieties of wood, and one of these is sugar maple.

for fruit, flour, cement, lime and almost innumerable other dry or partly dry commodities are known as slack cooperage. Maple is not used in tight cooperage, but in the other kind it ranks fifth in quantity among American woods. Those demanded in larger amounts are red gum, pine, beech and elm. The output of maple staves per year, according to latest obtainable figures, exceeds 133,000,000.

The average value of maple staves per thousand is \$5.42. Staves of all sizes and qualities are included in the average.

Heading and hoops constitute part of the stave industry. Maple supplies 13,633,000 sets of heading a year, at an average value of \$41.50 per thousand sets. Two-thirds of all



DRYING MAPLE LUMBER BY END-STACKING

The virtue of this method of stacking lumber lies in the better air circulation which it affords. The popular notion that the water drains lengthwise out of boards so stacked is erroneous. Little, if any, passes out by drainage.

maple heading comes from Michigan, and Pennsylvania follows. The yearly contribution by maple to the country's hoop supply amounts to 731,000 valued at \$3.76 per thousand. Most of the maple hoops are made in Maine. Elm is the leading hoop wood and the output of this species exceeds maple's forty fold.

VENEERS AND DISTILLATION

Maple ranks third as a producer of veneer, with a yearly output of 35,444,000 feet, log scale. The species above it are red gum, with 129,930,000 feet, and yellow pine, with 48,143,000 feet. Cottonwood and yellow poplar, respectively, are next below. The average cost at the mill of maple veneer is \$15.45 per thousand feet, log scale. The leading states in maple veneer production are Michigan, 15,350,000 feet a year; New York, 7,658,000; Indiana, 3,051,000; Vermont, 2,682,000; Wisconsin, 2,336,000, and Pennsylvania, 1,093,000. Practically all of the maple veneer made in the United States is consumed by the industries described in preceding paragraphs.

Maple is, without question, the leading wood in hardwood distillation in this country; but precise figures to show this cannot be quoted, because beech, birch and maple are listed without distinction. The three constitute 94 per cent of all hardwoods going to distillation plants. The wood is distilled by being passed through kilns or retorts, where sufficient heat is present to break down the structure of the wood. The chief commercial products are charcoal, wood alcohol and gray acetate. Michigan leads with a yearly consumption of 457,362 cords of wood, which costs on an average of \$3.03 a cord. Pennsylvania follows with 368,126 cords at an average cost of \$3.68, and New York ranks third with 139,041 cords, costing \$3.62. The value of the total product is placed at \$7,641,690 a year.



LOADING LOGS ON GONDOLAS

The "flying machine" is getting in its best work here. Though hard maple ranks among the heaviest woods, the logs are handled as if they were as light as broom handles.



Photo by the Field Museum, Chicago.

AN OLD-FASHIONED SUGAR CAMP

This rural scene lies near Pickens, Randolph County, W. Va., at an altitude of 2,700 feet. The stand of maple is pure. Buckets in place of the old-time sugar troughs are used to catch the sap which drips from the trees.

Maple Sugar Making

THE great importance of maple lumber and the other products manufactured from the wood should not throw too far into the background the industry which produces maple sugar and syrup. The northern states yield most, but such sugar is made in commercial quantities as far south as Georgia. In 1860 New York was the leading maple sugar state. Ten years later Vermont attained first place and held it for thirty years, and then lost it to Ohio. The general government and various state governments have concerned themselves in detecting and discouraging the adulteration of maple syrup and sugar. The temptation to doctor the product with impurities seems exceptionally strong. It is so easily done, and the fraud is so difficult for the ordinary consumer to detect that it has been found necessary that the strong arm of the law interpose its authority to protect the public.

All maples yield sugar, but the common hard maple and the variety known as black maple are usually considered best. The manufacture of maple sugar in this country has gone on since prehistoric times. The Indians understood the process very well, but their methods were crude. They caught the sap in bark buckets or in gourd shells; boiled it in bark troughs by dropping in hot stones, and they stored the sugar for future use in

bark boxes. Sugar carried in such retainers was an article of commerce on the frontiers a hundred years ago. Chicago was a maple sugar center before it had any business with grain and meat or with lumber. Early traders at Chicago reported as a common article the "barks of sugar" brought in by Indians to be traded for whiskey. Further to the northwest, where hard maple was scarce, the Indians made sugar from boxelder.

The sugar-making carried on by early white settlers was nearly as crude and unsanitary as that of the Indians, and in some rural communities there is still room for improvement; but where the industry is on a large scale, up-to-date methods prevail. The business pays. In Vermont the claim is made that a sugar grove brings larger returns than the same ground would bring if devoted to agriculture. In the past, most of the sugar has come from trees planted in nature's way, and at haphazard; but the tendency now is to plant trees, or at least to thin and properly space those which nature plants, so that they will not be unduly crowded, nor yet so far apart that they do not wholly occupy the ground.

The flow of the sap from which sugar is made takes place during the first warm days of spring. An erroneous idea prevails that the sap is rising from the ground to the tree's crown, and that the flow is due to that fact.

No foundation exists for that belief. There is more sap in the tree in winter than in summer. It accumulates during the summer and remains inactive, so far as movement is concerned, during the winter; but the sugar is being manufactured in the wood's pores and cells. When the warmth of spring appears, the air in the wood expands and causes a pressure which may amount to 20 pounds per square inch—more than the pressure created by a perfect vacuum. If an opening is then made through the bark and into the wood, the internal pressure, due to expanding air, forces the sap out. The cool of night lowers the temperature of the air in the wood cells, the pressure ceases, and the sap flow declines or stops; but the heat of the succeeding day restores the pressure and the flow again begins. That continues as long as the weather is alternately hot and cold. The earliest flow occurs in the spring while the tree's roots are still frozen, and it is not possible for sap to rise from that source. An artificial flow may be induced in midwinter by building a fire against the maple's trunk to warm the

until one has planted these they will not appreciate the pleasure of watching the development of a plantation of little trees.



A MODERN SUGAR CAMP

The sap is collected in galvanized iron pails and is carried in pipes of the same material to the boiling house. This is an improvement over the old-fashioned sled-and-barrel method of sap transportation, provided it is all downhill.

air within, thereby creating pressure by the expansion of the air sufficient to force the sap out. That process was formerly resorted to by settlers on the frontiers when sickness or some other cause demanded sugar in winter and none was available except that made from the maple trees with which the snowy forests abounded.

The New York State College of Forestry at Syracuse is maintaining in the State Forest Station at Syracuse an experimental nursery where over one million trees are produced annually. The College invites inspection of this forest nursery and of the experimental work being carried on in the Station. It will be glad to give information at any time regarding the kinds of trees that are best suited to different soils, methods of planting, care of trees after planting, etc. It is surprisingly easy to start a thousand evergreens and

Annual Meeting in Boston

THE annual meeting of the American Forestry Association will be held in Boston, Mass., on Monday and Tuesday, January 17 and 18. Headquarters will be at the Copley-Plaza Hotel and the business and general meetings will be held there with sessions each day in the morning and afternoon. A program suited to public and technical phases of forestry will be announced later and special attention will be given to the effort to extend the appropriation for continuing the purchase of Federal Forest Reserves under the provisions of the Weeks Law.

On Monday evening, January 17, there will be a Forestry Dinner at the Copley-Plaza under the joint auspices of the Massachusetts Forestry Association and

the several other forestry and forest protective associations in New England and the American Forestry Association, the purpose being to get together all the New England organizations interested in forestry. The speakers will comprise some of the leading men of the country and it is expected that several hundred people will be present.

Reservations for the dinner may be made now. Tickets are \$3.00 each. Those desiring tables for a special number should arrange for same at once. Reservations should be requested from Harris A. Reynolds, secretary of the Massachusetts Forestry Association, 4 Joy Street, Boston, or P. S. Ridsdale, secretary of the American Forestry Association, Washington, D. C.

The Reforestation Movement in China

By W. F. SHERFESEE
Director of Forestry, Philippine Islands

CHINA has long been held up as the horrible example of forest neglect. Her treeless hillsides have proved the text for many a lecture, and her floods have served to illustrate many a warning. The casual traveler, by river boat or railroad, in describing his impressions, has seldom failed to refer to the treelessness of the areas through which his route lay; and the technical forester and the conservation propagandist have joined the tourist in deprecating the negligence in the past which has deprived the present-day Chinese of one of the most essential elements of industrial civilization.

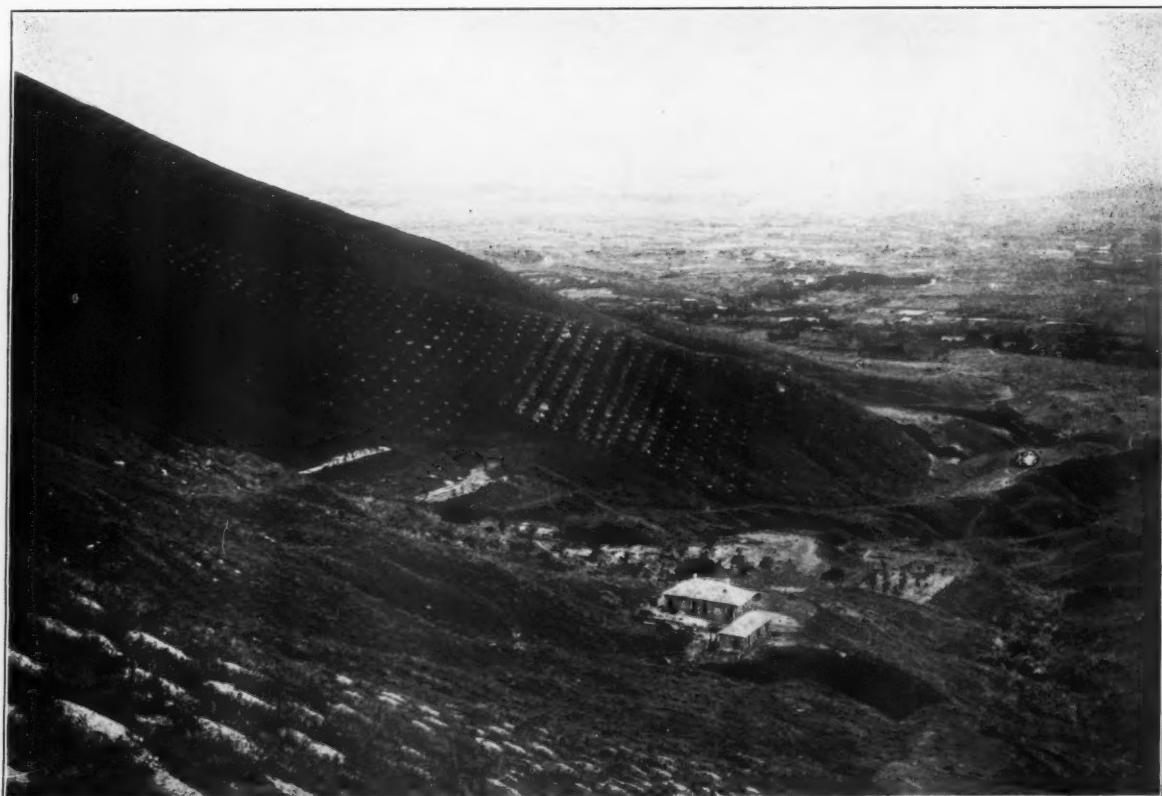
In most cases such accounts have not been exaggerations, for although there are said still to be found large areas of forest in more or less good condition, particularly in Manchuria, it is undoubtedly true that throughout most portions of the country the treeless mountains rise naked from the treeless plains.

That such a situation as this has had and continues to have a disastrous effect upon the industrial productivity of the country, as well as upon the comfort and well-being of its inhabitants cannot be doubted. Mr. Gifford Pinchot writes that—



NOTABLES AT TREE PLANTING ON PURPLE MOUNTAIN, NEAR NANKING, CHINA

A gathering to attend the ceremonial tree planting to mark the inauguration of the Forest School in the University of Nanking, March 15, 1915. The principal figures shown are (1) His Excellency, Chang Chien, Minister of Agriculture and Commerce, (2) United States Consul Williams of Nanking, (3) The Daodai, or Lieutenant Governor of the Province of Kiangsu, (4) Mr. Wang, the Mayor and Chief Magistrate of Nanking, (5) Mr. Chiu Chi Heng, the President of the Nanking Branch of the Chinese Colonization Association, (6) President A. J. Bowen of the University of Nanking. In the midst of the crowd are Mr. Ngan Han, in charge of the Forest Office at Peking, and Mr. P. C. King, Forester of the Province of Anhwei.



PURPLE MOUNTAIN NEAR NANKING, CHINA

General view of the lower slopes of Purple Mountain showing the house erected for tools, seeds, etc., and to serve as living quarters for the superintendent in charge of the work. The tree plantations are shown by light dots in the middle distance towards the left. The river visible in the distance is the Yang-tze-Kiang.

"Of the two basic materials of our civilization, wood and iron, the forest supplies one. The dominant place of the forest in our national economy is well illustrated by the fact that no article whatsoever, whether of use or ornament, whether it be for food, shelter, clothing, convenience, protection, or decoration, can be produced and delivered to the user, as industry is now organized, without the help of the forest in supplying wood. An examination of the history of any article, including the production of the raw material, and its manufacture, transportation and distribution, will at once make this point clear."

These remarks, while made with particular reference to America, apply with equal force to China. Most portions of the new republic lie well north in the temperate zone, where fuel for warmth is a vital necessity during a large part of the year. Existing industries require large quantities of fuel and of lumber and no one will hesitate freely to admit that with a cheap and abundant supply of these so essential commodities, the standard of living among all classes, their comfort, health and productiveness would all show a prompt and striking rise. But under existing conditions most of the needed forest products must be imported and the resulting drain on the financial resources of the country is among the least harmful effects of a most unfortunate situation. The chief harm comes from the handicap to industrial development, from the depressed standard of living, and from the low productiveness per capita. Even if means for

cheap and rapid transportation were available, importation of lumber from abroad could never form a satisfactory substitute for a domestic timber supply. The great mass of the population is poor and can ill-afford the added cost of transportation—even granting that it were low—and the profits of the many dealers through whom the imported wood must pass.

Since trees have vanished, brush and wild shrub growth of all kinds have eagerly been consumed, until the very roots of the plants are dug from the ground to serve as a scanty supply of fuel for cooking and for warmth. The dead grass and the stubble from the fields are raked clean to eke out the desperately needed but lamentably inadequate supply. And then comes fire during the late autumn to add its share to an already almost hopeless situation.

Naturally under such conditions floods are by no means rare, for the essential part played by forests in the protection of stream flow by conserving a large portion of the rainfall and giving it out later during the dry season is too well known and recognized to need exposition here.

In this connection, also, the fixation of wind-driven sands and loose earth is too important to be overlooked. To bring about such a result there is in most places no agency so effective and so profitable as the establishment of forest growth.

The magnitude of the task in China, the appalling amount of work which should be done, need not prevent a beginning being made, if only on a small scale, for while flood prevention and to a lesser extent the fixation of wind-blown earth require for best success that operations should be undertaken and carried through on a large scale, the most pressing need of all—that of raising a cheap and abundant supply of fuel and timber—can be taken up on any scale, large or small, according to the available means.

Through the energy, perseverance and skill of Prof. Joseph Bailie, cordially and actively supported by influential Chinese and by the University of Nanking, an admirable beginning has already been made on the slopes of Purple Mountain, just outside the walls of Nanking, and a School of Forestry has been opened at Nanking. There is every reason to expect that a high degree of success will continue to attend these efforts and that they will, as they should, serve as an object lesson and as an encouragement for the inauguration and wide extension of similar projects.

At the invitation of the University of Nanking, and through the courtesy of the Governor-General of the Philippines, the writer has recently been given an oppor-

tunity to visit the newly established Forest School in the University of Nanking and to study the reforestation work on Purple Mountain. Also, through the courtesy of Governor Han of Anhwei Province, facilities were afforded a party, of which the writer had the good fortune to be a member, to make careful studies of many of the hills and mountains in the provinces to determine the feasibility of forest planting, and if conditions should prove favorable, to recommend the general lines on which such work could be undertaken with best chances for full success.

To the writer at least the most astonishing fact revealed by these investigations is the great extent of excellent land lying waste on hill and mountain. In many places the population is overcrowded and desperately poor, yet in the immediate vicinity, rising perhaps from the very outskirts of the overcrowded towns and villages, are fertile but unused hills, excellently suited for forest growth. In fact, a considerable portion of these huge waste areas is covered with soil too good for forest growth—not that forest would not grow excellently in such situations, but that as the soil and configuration are suited for fruit growing or even for the intensive cultivation of agricultural crops, it should be put to these



PHOTOGRAPH TAKEN IN COMMEMORATION OF THE ESTABLISHMENT OF THE NANKING BRANCH OF THE CHINESE COLONIZATION ASSOCIATION

First Row (Seated) Reading from Left to Right—1. Su Si-tai, President of Nanking Chamber of Commerce. 2. Wu Chia-hsiu, President of Nitrate Mines. 3. Dr. Macklin, University of Nanking. 4. Hsu Ch'ien, Commissioner of Industry of Kiangsu. 5. Han Kuo-chun, Civil Governor of Kiangsu. 6. Ch'u Lai-chih, formerly Vice-President of Kiangsu Provincial Assembly, President of Nanking Branch Colonization Association. 7. Wei Chia-hua, President of Charitable Associations of Kiangsu, Auditor of Accounts of Colonization Association. 8. Chin Ting, Associated Director of Hsia Kuan Chamber of Commerce.

Second Row (Standing)—1. Chang Kuan-ch'i, Acting President of Agricultural Association of Kiangsu. 2. Chang Han-ru, Vice-President of Chamber of Commerce of Nanking. 3. Tao Pao-tsing, formerly Representative to National Assembly. 4. Ku Ch'i, Investigator at Civil Governor's Office. 5. Lou Yuin-ch'ing, Secretary to Commissioner of Industry. 6. Joseph Bailie, University of Nanking. 7. Chung Hung-shen, formerly Judge in Chekiang Province. 8. Liu Wei-li, Secretary in Civil Governor's Office, formerly District Magistrate of Kiangning. 9. Mr. Magee, Foreign Treasurer of Colonization Association. 10. P'u Ch'i, Second Secretary in Civil Governor's Office.

Third Row (Standing)—1. Chen Tu-hsiu, Secretary in Civil Governor's Office. 2. Tang Ch'ing-shen, Proctor of Law School. 3. Chung Fu-ching, President of Law School of Kiangsu. 4. Kan Hung, Vice-President of Chamber of Commerce. 5. Wang Hsi-hsiang, Treasurer of Office for Road Building, Treasurer of Colonization Association. 6. Chang Ts'en-pi, Chief Auditor for Office of Road Building, Secretary of Colonization Association. 7. Huang Kuei, Director of Agricultural Station of Colonization Association. 8. Hsia Ren-hsiu, Secretary of Internal Affairs, Office of Civil Governor.



PLANTING THE FIRST TREE ON PURPLE MOUNTAIN

The figures in the foreground, from left to right, are His Excellency, Chang Chien, Minister of Agriculture and Commerce; United States Consul Williams, of Nanking (stooping); serving as Representative of the United States Minister in Peking; and with spade poised in mid-air, Mr. Sheldonridge, of Shanghai, Editor of the *National Review*. Mr. Bailie is seen standing in the center of the photograph.

more profitable uses. As is to be expected, however, by far the larger portions of these hills and mountains are suited to forestry alone—their poor, shallow soil, their slope, or their rock-strewn surface rendering them unfit for more intensive use. Some of these idle lands are held under private ownership, but title to the greater portion is held by the government. Every consideration urges that these waste lands be put to the various uses to which they are so well adapted—that they should be made to produce the forest or agricultural crops for which there is such pressing need. Land suitable for agriculture should be put under intensive cultivation. Of that which remains as much as possible should be devoted to fruit growing—and the remainder, the largest portion of all, to the production of fuel, timber and other products of the forest. Fruit trees found growing wild on hillsides prove that success will attend such operations if they are conducted with reasonable skill and care. Found growing naturally were species of wild pear, persimmon, peach and cherry and young bushes of the soft jujube. And if additional assurance of success should still be desired, it is to be found in the fruit orchard occasionally encountered—established and cared for by private owners of land on the lower slopes of the hills, and yielding most satisfactory returns.

Also throughout practically all of the areas we visited we found that in spite of the scarcity of seeds, in spite of the eager activity of fuel-gatherers, the rudiments of forest growth are still present; and when given a chance that they develop into forests of fair density and form. It is seldom or never that even small areas of such

natural forests are left undisturbed to show what could be expected if nothing more were done than to protect the natural growth from fire and cutting. But the presence of any forest growth whatever under such circumstances is a very strong proof that little or no risk is involved in undertaking artificial reforestation. Among the tree growth found naturally in Anhwei Province are pine, oak, chestnut, elm, maple, hackberry, willow, ailanthus, cypress, of which the Chinese name is Peh-Mu Shu; Cunninghamia lanceolata or Sha-shu; Liquidambar or Feng; pistache, or Lien Shu; the Wing Nut; Dalbergia hupeana or Tian Shu and many others.

That forest planting, on a large scale or small, on these idle lands found so abundantly throughout China, would be highly profitable cannot be doubted. The soil and climate are excellently suited to the purpose. Labor is abundant, very

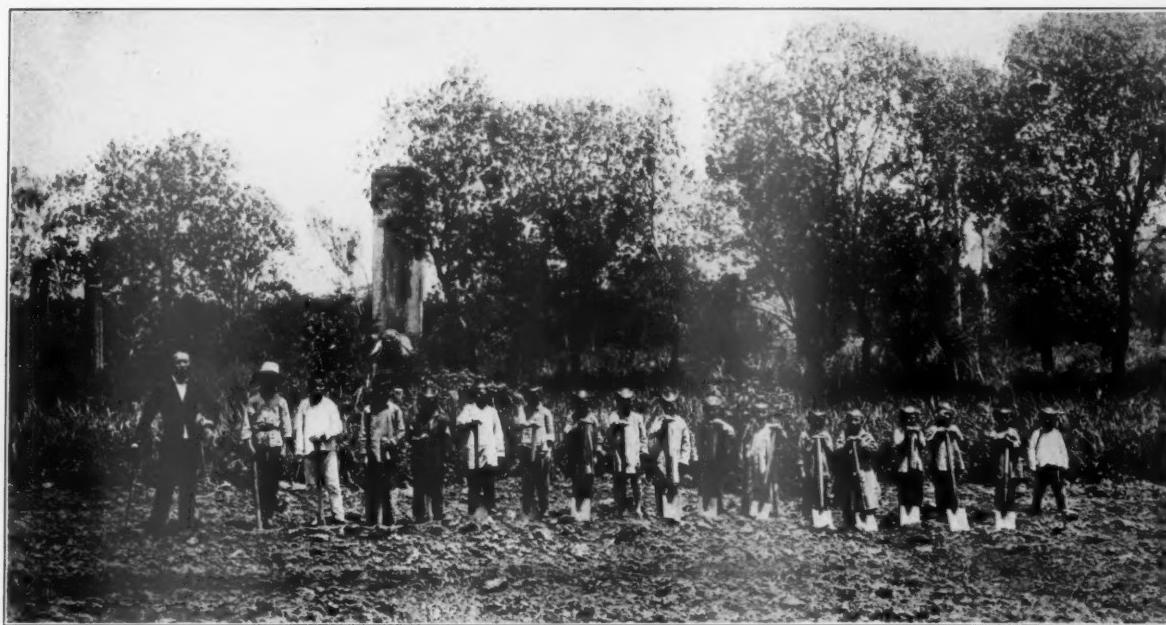


A FEATURE OF THE REFORESTATION WORK

Transporting humus from a nearby lake-bottom to enrich the soil in the nurseries and in the plantations on Purple Mountain.

cheap and can be made highly efficient by proper instruction. As there is a greedy demand for forest products in the immediate neighborhood, market conditions and transportation present no difficulties. Nor is it necessary to postpone the returns until the trees have reached sufficient size to produce saw logs. A very much shorter rotation may be adopted, due to the heavy demand for fuel and for small round timber of all kinds and dimensions. All necessary conditions, so far as we were able to anticipate, are present, nor is there any difficulty which cannot be overcome by the exercise of ordinary skill and foresight. In comparison with most situations in which reforestation has been successfully carried out in the United States, the conditions in China are extremely favorable.

It is unlikely that the Chinese government, either now or at any time within the near future, will feel in a position itself to carry on extensive work in reforestation.



CHINESE PUPILS FROM THE FORESTRY SCHOOL AT NANKING, CHINA

Pupils, with their teacher, ready for a practical lesson in transplanting seedlings of forest trees. The stone figure in the background is a large monolith (marking the grave of a general) borne on the back of an enormous stone turtle.

Even if funds were available, the personnel is lacking for such work to be undertaken and carried out on a large scale. It is to the private owner or planter, therefore, that we must look for the reforestation so badly needed throughout the country. Thus the first steps should be to encourage the owners of private land now lying waste to plant with profitable trees of fruit or forest species; to get the idle public land into private ownership or under private use; and by seed distributions, by the establishing of tree nurseries to supply the young stock, or by actual demonstrations made or instruction given on the ground, to assist the private individual to secure the greatest returns from his time and labor. Especially at first, experiments should play but small part. It is most important that the initial efforts should succeed and one of the surest ways to accomplish such a purpose is to use a tree species found growing naturally in the vicinity and under the actual conditions which the young, new forest will have to meet. Later on, when the practicability of the work has been abundantly demonstrated, exotic species can be included with probable profit and without much risk.

It is along these lines that Prof. Bailie has conducted his notable work on Purple Mountain. Undertaken originally as a means for giving needed

succor to sufferers from famine, it has now definitely justified its own existence, and it has proved the soundness of his plans and the skill and common sense which underlay his energy and enthusiasm. It has put to profitable use large areas which had hitherto lain idle. It has given temporary employment to thousands, and many families now gain a comfortable and permanent livelihood on land which would otherwise have remained indefinitely unproductive. It has resulted in the establishment of a comprehensive course in forestry in the University of Nanking; and probably most important of all, it is serving and will serve as an inspiration and encouragement for the inauguration of other, and possibly larger, projects elsewhere throughout the new republic.

As stated above, the reforestation work on Purple Mountain had its beginnings in a recent famine which rendered countless Chinese homeless and destitute. Thousands flocked to the city of Nanking and naturally looked to the University and to the missionaries for assistance and relief. At first, money and food were supplied by direct distribution, but Prof. Bailie conceived the better idea of employing the destitute in some useful work which, while meeting their immediate necessities, would also provide at least some of them with a permanent and suitable



PROF. JOSEPH BAILIE



HOME OF A CHINESE COLONIST

This family has been established in the stand of pine, a few trees of which are to be seen in the picture. The house is built of stones, reeds and grass and is typical of the residences of this class of Chinese.

livelihood. They were, therefore, given the task of building roads to and around Purple Mountain and of putting the waste land on its slopes and foothills into a productive condition. The introduction of agricultural crops on the rich land at the base of the mountain was the first object, but it was soon found that as such areas were naturally limited, reforestation must be depended upon for the utilization of the great body of land on the upper slopes. It was also realized that in order to make the plans permanent and adequate, Chinese sympathy and cooperation must be obtained. The formation of the "Colonization Association of the Republic of China" was the first natural outgrowth.

Readers of AMERICAN FORESTRY will doubtless find much of interest in the following petition sent to Governor General Cheng of Kiangsu Province by His Excellency, Chang Chien (at that time Minister of Agriculture and Commerce and still chairman of the Colonization Association), and others:

"Your Excellency:

"We (Chang Chien, Ma Liang, Chiu Chiheng, Ku Chi, and Chang Tzu-lin), representing the Board of Trustees of the Colonization Association of the Republic of China, respectfully present this petition, requesting your examination and permission for registration.

"The Chinese nation was built up on farming. As early as the medieval times, the "well" system of land division had been organized on a sound basis conforming to the principles of modern socialism. Unfortunately, with the wars and the feudal states and the tyrannical rule of the Chin Dynasty, this system degenerated and finally

went out of existence. The fertile lands lying both in the north and in the west were then laid waste, to say nothing of the already barren regions where cultivation and improvement were never thought of. With natural resources thus undeveloped, our people have been led from idleness to poverty, which is mainly responsible for China's weakness—a condition truly deplorable!

"It is for this reason that we have started the Colonization Association with a view to relieve the poor through the cultivation of the waste plains and valleys. Under the guidance of Joseph Bailie, an English professor specializing in agriculture, the colonists shall be taught farming along modern lines. The details of our scheme are contained in our regulations. All the executive officers of our Association are elected from among the Chinese Committee. Four thousand *mow* (700 English acres) of land have been secured on Purple Mountain, outside of Nanking, for the pur-



CHINESE FORESTRY STUDENTS

The type of bright enthusiastic young men who are being trained to be the future foresters of China. They are making rapid progress in their studies.

pose of experimentation, which, if successful, will lead to further extension.

"We therefore enclose our Regulations for your examination, with the request that proper registration be permitted to us, that order be given to the local officials to issue proclamations, and that the Boards of Agriculture and Finance be notified to that effect, so that all provinces may know what we aim to accomplish.

"This is our Petition."

The Governor General replied as follows:

"To Chang Chien and other Trustees of the Colonization Association of the Republic of China:

"Your petition has had my attention. It is true that the Chinese nation was built up on farming. The "Well" System, so well organized during the Medieval Ages, found some traces in the two Hans when they made efforts to encourage agriculture. It was not until after

the Tsin and the Wei Dynasties that this ancient principle was entirely forgotten. Since then, things went from bad to worse; and today the economic tide of our people has almost reached its lowest ebb.

"To have such large tracts of land lying waste and barren in a country known to the world to be the richest in natural resources, is certainly deplorable! You gentlemen have done well by organizing the Colonization Association. You are laying the foundations for national development and paving the way for Chinese colonization. I can not peruse your petition without appreciating your good ideas and well-laid plans.

"It is also gratifying to note that Mr. Bailie, out of

which was discontinued at the outbreak of hostilities with Japan. For each student the University receives 130 Chinese dollars per year, for which it provides tuition, lodging and meals. Their clothing and incidental expenses are supplied by the students themselves. The scholarship also provides a yearly cash allowance to each student of \$30 for the purchase of books and other needed incidentals. This allowance is increased by \$10 a year during each year of the course. Thus \$700 dollars local currency will meet the student's needs during his four years' residence at the school.

The average age of the students is probably about 22. They are a strong, sturdy, intelligent set of students who would do credit to any institution. It has not yet been possible to start technical instruction in forestry, as the students are not sufficiently familiar with English to receive instruction in that language and there is a dearth of textbooks and reference books on forestry published in Chinese. Accordingly, for at least 18 months, that is, until the fall of 1916, most of their time and energy are being devoted to an intensive study of English which will enable them to take advantage of forest literature published abroad.

The most encouraging feature of the entire work is the eagerness with which the provinces, and even the central government, are planning to inaugurate similar



TEMPLE USED AS A SCHOOL

A former Buddhist temple (in the interior) now devoted to school purposes by the Chinese Colonization Association. The large arch in the foreground is the formal gate with which all temples are customarily provided.

his love to humanity, has offered his valuable services for the relief of the poor. He will greatly profit our farmers by teaching them modern methods of agriculture.

"I hereby permit your Association to be registered; I order the local officials to issue proper proclamations; and, further, I send despatches to the Boards of Agriculture and Finance so that your purpose may be known to all the provinces.

"This is my reply."

The Forest School made its first beginnings in the Spring of 1915 with the enrollment of seventeen students, all of whom hold scholarships: three from the famine relief fund, five from the Governor of Anhwei, five from the Governor of Shantung and six who had formerly attended the German Forest School in Tsingtau,



ROAD-MAKING ON PURPLE MOUNTAIN

Here coolies take the place of draft animals. Note men who are supervising the work carrying umbrellas.

projects elsewhere. Governor Han of Anhwei Province has easily shown himself the most progressive in this respect. In a speech which he recently made occurred the following statement:

"China has long been an agricultural nation. Nanking and its neighborhood were left barren and deserted by the recent wars. Such wrongs fill men's hearts with shame. It is very fortunate Mr. Bailie has taken every possible means to encourage agriculture and forestry. But the Purple Mountain is but a limited area, and unless this work be extended to other villages and magistracies, the plan lacks perfection. I have personally visited Mr. Bailie's Experiment Station, and my heart

was filled with veneration for his works. I hope that the people of Kiangsu will follow his example. I, being confined to my official duties, hope that, in the future, when released from my post, I may learn the method of agriculture and forestry under Mr. Bailie."

In the service of Anhwei Province under Governor Han is Forester P. C. King, a recent Chinese graduate of Cornell, whose efforts are now being directed towards the wide extension of forestry in his province. While the leaders of the reforestation movement in China will undoubtedly meet with many difficulties and discouragements which are inseparable from pioneer work of all kinds, there is every reason to believe that the work has made a sound and permanent beginning and that future decades will show a very different and much happier state of affairs from that which the present generation has inherited from its ancestors.

NOTE.—Much of the credit for founding the Nanking Forest School belongs to Major Geo. P. Ahern, former director of Forestry in the Philippine Islands. In 1910 Major Ahern visited China and was impressed by the vast areas of country entirely bare of any tree growth.

A little later he wrote to Hon. Amos P. Wilder, American Consul General at Shanghai, as follows: "While in China last fall I was impressed with the need of a Forest Service of that country. It is one of the crying needs of China today. If Chinese students, trained in American methods, later on found a Chinese Forest Service it will mean that the development of their forests will be along modern lines. It will mean another link in the chain of friendship that now binds America and China."

By conferences and correspondence Major Ahern then arranged for the entrance and maintenance of Chinese students in the Philippine School of Forestry and a number of Chinese have since been under training there. Last Fall Major Ahern suggested to the authorities of the Nanking University a plan for establishing a school of forestry at Nanking, the plan was approved and he was asked to participate, but illness prevented his acceptance. The school was opened last March under promising auspices.—THE EDITOR.

Land Speculators Block Settlement

DURING the last decade, the Forest Service has classified as agricultural and opened to public entry more than 15,500 individual scattered tracts of lands in the national forests, comprising more than 1,700,000 acres, says an article by the Chief Forester, published in the Year Book of the Department of Agriculture, just issued. Within the last two years, in addition, several large blocks have been eliminated aggregating more than 2,500,000 acres, while nearly 2,000,000 acres more are now under consideration for elimination. All the remaining agricultural land in the national forests is confined chiefly in isolated tracts scattered here and there; to restricted areas requiring irrigation, where water cannot be obtained; and to certain river bottoms and benches which are not covered with very heavy and valuable timber.

A constant pressure is being brought to bear on the Government by private individuals who want to acquire possession of these heavily timbered agricultural lands, single quarter-sections of which often have a value as high as \$20,000 for the timber alone. In spite of the fact that some of these lands have soil suitable for agriculture, to throw them open as homesteads would not result in farm development. This has been proven over and over again where lands of this kind, acquired under the Homestead Law, are today held not by homesteaders but by lumber companies, who promptly purchased them from the settlers as soon as title passed from the Government—a speculative process which effectively prevents men of small means from acquiring land and establishing homes.

The Government is withholding from agricultural entry all such heavily timbered land until after the timber is cut off. As soon as this is done, the land will be

opened to entry and settlers will be able to acquire it directly from the Government without cost, instead of having to pay from \$40 to \$60 an acre to land speculators. For example, on the Kaniksu National Forest in Idaho and Washington, the Government's timber sales have been made to include much of the remaining timbered agricultural land. Within eight years fully 10,000 acres will be made available for settlement. Permanent homes will be established by the settlers, and there will be available for the use of communities approximately \$225,000 for roads and schools, their legal share of the proceeds from the timber sales. Private ownership of heavily timbered agricultural land blocks farming development, says the article; Government ownership insures such development under conditions that give opportunities to the small settler whose only capital is his strength and courageous perseverance.

One of the most serious agricultural problems of the northwest today is the development of the logged-off lands in private ownership. In Oregon and Washington alone more than three million acres of such logged-off lands are lying idle, although much of this area has fine agricultural soil and a climate that insures abundant crops and the development of thriving communities. Yet in this same region hundreds of settlers are seeking to find places in the national forests, usually remote from transportation, high in the mountains, where the climate is harsh and the soil relatively poor, simply because the good lands at lower levels outside the forests are held by the speculators at prohibitive prices. The true solution of the problem of agriculture in such sections is to develop the rich logged-off private lands that lie outside the forests, and not to throw open the non-agricultural lands within the forests.



THE QUEER GROWTHS KNOWN AS "CYPRESS KNEES"

These growths are sent up by the roots of the cypress tree and they are generally hollow and vary from a few inches to several feet in height. It is generally believed that their function is to furnish air to the roots of the tree because they die when the water in which many of the trees grow is drained off.

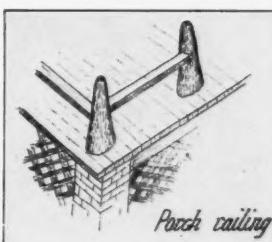
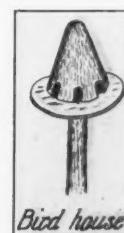
Suggestions for Using "Cypress Knees"

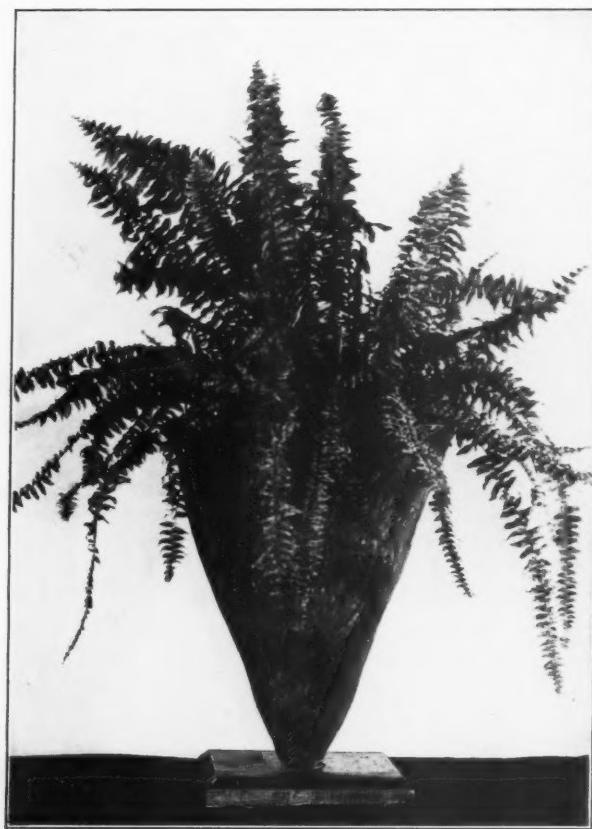
BY HOWARD F. WEISS

Director of Forest Service Laboratory at Madison, Wis.

THOSE familiar with cypress timber and the conditions under which it grows are also familiar with the queer growths known as "cypress knees." Cypress grows best in marshy ground or even in quite deep water in the southern portions of the United States. When the trees stand in soft ground which is covered with water a large part of the year, the roots send up peculiar growths known as "knees." They are sharp, cone-shaped and generally hollow. They vary from a few inches to several feet in height and under ordinary conditions extend above the water. It is generally believed that the function of these knees is to furnish air to the roots of the tree, because when the water is drained away they die. They also furnish a firmer anchorage for the roots in the soft earth.

The illustration at the top of the page shows a typical scene in one of the cypress stands. This indicates the large number of these knees which might be collected at a relatively small cost during lumbering operations if





CYPRESS KNEE USED AS A FLOWER JARDENIERE

they could be utilized. At present they are occasionally used locally for rustic furniture such as lawn tables and benches, but no extensive use has been made of them.

An accompanying photograph shows how cypress knees have been utilized for flower jardinieres at the Forest Products Laboratory, Madison, Wisconsin. Many other similar uses might be made of them and a number of such uses are indicated in the other illustration.

The principal difficulty experienced in making such articles is in properly drying the knees. They generally check badly, but with a demand for them well established, some satisfactory method of treatment and seasoning might certainly be perfected.

THE FIRST TOWN FOREST

FITCHBURG, Mass., claims to be the first municipality in the country to have officially set aside under a State law an area which is not connected in any way with its parks or water supply system for the express purpose of growing trees for profit. The action of the city government was taken in accordance with the Town Forest Law—known as the Public Domain Act of 1913—by which cities and towns within the Commonwealth may own, control and operate forests. For this purpose, four tracts aggregating 105 acres in extent have been set apart to be known and used as a Town Forest. These tracts contain 50, 31, 16 and 8 acres, respectively. About one-fourth of this land is

now covered with white pine ranging in age from 20 to 60 years. The remainder is cut-over land, now partly covered with sprout growth so common in Massachusetts.

The city forester, Mr. Page S. Bunker, will prepare working plans for this area and the planting of the cut-over land to white pine will begin next spring. Mr. Bunker was connected for many years with the United States Forest Service and is ably fitted to develop an efficient forest for the city. He has been in his present position but a few months.

This action by the city government was inspired chiefly by the Park Commission, and the Fitchburg Branch of the Massachusetts Forestry Association. A petition was presented by the chairman of the Park Commission, Dr. D. S. Woodworth, asking that this land be utilized as a Town Forest. It was supported at the hearing by the president of the Branch Association, Hon. Frank O. Hardy, an ex-mayor. Fitchburg was the first municipality in the State to organize a local branch of the State Association and the sentiment for conservation is very strong.

While this is a very feeble beginning toward the establishment of an efficient Town Forest, it is tremendously significant in view of the fact that it is the beginning of one of the greatest movements for conservation ever started in this country. Town Forests are bound to increase in number and area very rapidly since the public is becoming alive to their wonderful possibilities and practical advantages. There are nine States that already have laws permitting towns and cities to create and manage their own forests.

A great many cities and towns throughout the country are practicing scientific forestry to a greater or less degree on lands owned by the municipality, but in every case so far as we know, this work has been done in connection with the public parks or for the purpose of protecting the water supply. In other words, the matter of timber production has always been a secondary consideration.

Through the interest which has been created in Town Forests in Massachusetts, by the Massachusetts Forestry Association, it is believed that many such forests will be started in Massachusetts. The Association has offered to plant fifty acres to white pine, in the Town Forest of the city or town which makes the best showing in the establishment of such a forest this year. This prize, which consists of 60,000 three-year-old white pine transplants, is well worth striving for and is creating a keen competition.

Ten entries must have been made before the prize will be awarded. To enter the contest, at least one hundred acres must be, officially, set aside as a town forest under the new town forest law and fifty acres of this area must either be planted to trees or already contain forest growth of commercial species. If the contest succeeds, there will be over 1,000 acres of Town Forest in the State, and a half or more of it will be covered with timber-producing trees. It is a small beginning of a very big and important movement.

Growing Pine at a Profit

By J. R. SIMMONS

Assistant State Forester of Massachusetts

A PINE seed, planted and grown under average conditions, will produce, in fifty years, a tree one foot or more in diameter. Waste land in the state of Massachusetts, if reforested this year with four-year-old pine transplants, would yield \$376,000,000 worth of lumber in 1965. Deducting from the cost of planting and care, the interest on the investment and the taxes for the fifty years, would leave a net profit of \$140,000,000. This calculation assumes that there are 1,000,000 acres of waste land, and that the cost of planting would be \$12 per acre, that the land is registered under the new forest taxation law—a law similar to those now in force in New York, Pennsylvania, Connecticut and Vermont—and that lumber will be worth as much fifty years hence as it is today.

Fifty years is a long time to wait for returns on an investment; especially so when the expected results of

the planter are based upon a theory or upon the experience of a state or national government. One of the greatest hindrances to the work of private forest building has been the lack of any record of individual success. It is not, however, necessary to wait so long. The fifty-year period was referred to merely because the maximum profit is gained in that time. Forest stands now in existence demonstrate that up to fifty years the trees grow faster than the interest on the investment. The turning point comes with the retarded growth of the pine.

Looking back a period of years it is found that there was as much interest in forest planting in the Eastern states between 1820 and 1880 as there is today, with the result that large plantations were made by private individuals and some few by corporations. Seedlings were usually dug up from fields surrounding old seed pines



FORTY-ONE-YEAR-OLD WHITE PINE PLANTATION

This picture was taken after the stand had been properly thinned according to the most approved forestry methods and is a striking illustration of what might be accomplished with much of the non-agricultural land in Massachusetts if it were planted with white pine and protected from fire, insects and disease. The stand is near South Lancaster, Mass., and is owned by Mr. Harold Parker.



FIFTY-YEAR-OLD WHITE PINE PLANTATION

The author estimates that waste land in Massachusetts planted this year with four-year-old pine seedlings would, in 1965, after deducting cost of planting and care, interest on investment and taxes, yield a net profit of \$140,000,000.

and planted, either at random or in rows, and spaced at distances varying from four to fifteen feet. At the end of that period there were in Massachusetts alone forest plantations to the extent of 10,000 acres.

Interest then began to decline, owing to the immense supply of lumber brought in from the region of the Great Lakes at a low rate of transportation, and also to the inadequate methods of combating forest fires. These conditions tended to gradually dampen the enthusiasm of the forest planter.

Some of the plantations still remain. Despite the fact that they have received little or no treatment and, with one or two exceptions, have not been thinned, they have reached maturity, and stand as a record for the present generation of what the results of reforestation will be.

During the winter of 1914 the writer made and investigation of these old stands in connection with his work in the State Department of Forestry. Something as to the history of the plantations was learned from the owners, and then they were measured, either as entire



WHITE PINE PLANTATION AT REHOBOTH, MASSACHUSETTS—EXTERIOR VIEW

This plantation is fifty-five years old. Pasture trees were used, being planted about eight to ten feet. Careful measurement showed that there are in this tract about 43,500 board feet to the acre. The regularity of the growth is due to the great care originally exercised in lining up the rows.

tracts, or by the selection of sample plots, and the results in each case were reduced to terms of board measure.

Among the plantations measured is one fifty-five years old at Rehoboth, Mass., owned by Mrs. Clara I. Hubbard. It was planted by a Mr. Christopher Carpenter, and pasture trees were used, and spaced about eight to ten feet. So regular was the growth found to be, and so much care was originally exercised in lining up the rows, that a slightly different method than that of sample plots was employed in measuring. Two rows of trees through the tract were taken for heights and diameters, and the contents in each case multiplied by the total number of rows. A sample plot was selected as a check on this work and gave about the same average result. Sixty-six rows, covering about seven acres, were found to contain 304,590 board feet, or about 43,500 board feet to the acre.

At South Lancaster, Mass., two plantations were measured. The first, that of Mr. Harold Parker, had been investigated by the Government nearly ten years ago and four sample plots laid out and the trees numbered. A record of this data was loaned by the Department of Forestry at Washington, and with the help of this the amount of tree growth for the decade was determined. It was found that the stand was making a current annual gain of about 1,000 board feet to the acre.

The other plantation at South Lancaster is mentioned because, in this case, a thinning was made in 1908, being practically the only stand on which work of this kind was carried out. Fourteen thousand feet of box boards and 40 cords of wood were removed. The dead branches, so persistent on white pine, were knocked off from the trunks of the trees in order to improve the appearance of the grove. The planting was originally done in two sections. The sixty-year-old growth measured 43,620 board feet, and the forty-one-year-old 26,000 board feet to the acre.

A summary of all the measurements made shows that plantations 30 to 40 years old would yield, if cut, 21,910 board feet; plantations 40 to 50 years old, 32,726 board feet, and plantations 50 to 60 years old, 41,186 board feet to the acre. These results compare very favorably with native stands of white pine, measurements for which have been carefully made for several years under State Forester F. W. Rane, both in the field and at the mill. Assistant Forester H. O. Cook in 1914 compiled a table of rotations for native pine for assistance to wood-lot owners in applying the new forest taxation law. The gross returns are represented by the stumpage value obtained from a yield table made by measuring sample plots in well-stocked stands in all parts of the state. On comparison, the amounts given in this yield table are in substantial agreement with the average shown by the plantations. The stumpage rates chosen run from \$6 to \$10, which are the rates of the present day, no allowance being made for the future increase in lumber prices. By



INTERIOR VIEW OF PLANTATION

Showing the regularity of planting and growth in trees which are now fifty-five years old. It is estimated that the net profit of this white pine if cut now would be at the rate of \$140.25 an acre.

substituting, therefore, the plantations for the native stands, the profit or loss on the investment may be determined from the time when the trees are old enough to yield lumber to the time when they enter the period of old age. The cost of the land is assumed to be the first expense, and is placed at \$5 per acre. The second is the cost of planting, which is placed at \$12 per acre and includes both the raising of the seedlings at the nursery and the final planting of them upon the land selected for forest. The tax rate is placed at \$20 per thousand. The land pays taxes from the beginning, but the timber, if classified under the new law, not until it is cut, when it pays a product tax of 6 per cent. All of these expenses are carried at 5 per cent compound interest to the end of the rotation.

At thirty-five years the interest on the land value would be \$22.56, the cost of planting plus interest would be \$66.18, taxes and interest would be \$7.85, tax paid if

trees were cut \$8.18, representing an investment of \$23.35 or an investment plus interest of \$96.59. Cut at that age, the lumber yield per acre would be 17,000 board feet, valued at \$136, of which \$39.41 would be net profit. By the same process, the net profit at the age of forty years would be \$62.42, at the age of forty-five years \$80.59, at the age of fifty years, \$140.25. The maximum yield comes at fifty years. The trees would continue to grow after that time, so that the total yield in board feet at sixty-five years would be 46,200 board feet per acre, as against 37,600 board feet at fifty years; but compound interest would grow still faster at that age, and the net profit would be less in sixty-five years than in fifty years.

In the light of these measurements, can it be said that forest building and forest improvements are interests adapted only to the rich? At present prices on lumber, a pine plantation is a 6 or 7 per cent investment in Massachusetts, but an increase in stumpage values of whatever per cent will make a corresponding increase in the returns. Young men who plant forests today can begin to look for profits at once if they plant for speculative purposes, as the land commands a higher price in the real estate market after a growth of trees is established upon it than before it is planted, and profit from the sale of lumber begins at the end of thirty years, when the stumpage value will have caught up with the cost, taxes and interest.

Love of Shade Trees

BY MRS. EMMONS CROCKER



MRS. EMMONS CROCKER

Ex-Chairman of Conservation, General Federation Women's Clubs and
Vice-President of the American Forestry Association.

ASIDE from the grateful shade on a hot summer day, few persons appreciate the value of trees on city streets. They do not realize to what an extent trees cool the atmosphere in hot weather—and, still more important, how they purify the air by absorbing the gases exhaled by man and animal and giving out large quantities of oxygen which animal life requires.

Lavish is the praise due the American Forestry Association for the work it has done in dealing with the great question of forestry—in helping to preserve the integrity of the national forests and using its influence to acquire new tracts important to the welfare of the people; in encouraging the organization of state forestry associations to look after the interests of the commonwealths.

Now it has taken up the more intimate question of city trees because, although in some states this phase is well in hand through state organizations that have in turn founded city and town societies for the care and planting of trees in the streets, there are others that are in dire need of its assistance.

It cannot receive too hearty support in this new undertaking.

I hope that all who are invited will consider it a privilege—an act of patriotism—to become members of the American Forestry Association and thereby aid in sustaining the great service it is rendering the nation.

The Bird Department

By A. A. ALLEN, PH.D.

Assistant Professor of Ornithology, Cornell University

CONSERVING THE WATERFOWL

FOR over a month now, sportsmen throughout most of the country have been enjoying the hunting of waterfowl. The frosts in the north and the falling temperature have driven them southward in ever-increasing numbers and, on favorable days, countless flocks have filled the air on their way to better feeding grounds in the south. Many have stopped in passing, lured by calls of their fellows or by decoys sporting about in attractive ponds and marshes, and many have appeared on the tables of successful gunners as the most tempting item on the menu. For the ducks and geese are far from extinct. In spite of the fact that their present numbers represent but a small fraction of the innumerable hordes that formerly swept over the country twice a year, they still visit us in numbers sufficient to be of value in the nation's food supply and to make the hunting of them a legitimate and successful sport. They have withstood the persecution of unrestricted shooting better than any other game and, with the laws that are now in force and the resting spots that have been granted them, they are likely to hold their own unless some unthinking legislature should see fit to change the statutes.

Fifty years ago the ducks received no protection at all. The supply was thought inexhaustible and they were hunted from the time they appeared in the fall until they left again in the spring, and in states where they nested they were shot by unprincipled gunners even during the breeding season. As they became more and more wary, various devices were contrived to make the killing of them easier. "Big guns" with a range far greater than that of ordinary guns were fastened in the bows of skiffs and in some places cannon, loaded with several pounds of shot, were trained upon the waters and the ducks baited within range by scattering grain. Even at night there was no respite, for searchlights were thrown upon their roosting beds and murderous volleys poured upon them. This was not sport, but it supplied the tremendous demand for them in the market.

When you consider, in addition to this barbarous slaughter, the fact that most of the United States breeding grounds in northern Indiana, Illinois, Wisconsin and Minnesota were rapidly becoming wheat fields and gardens, it is not surprising that the decrease in their numbers soon became appalling, and that the various states began to pass laws restricting the shooting, laws that have culminated in the passage of the Weeks-McLean Bill, which gives the Federal Government jurisdiction over all migratory birds, including the waterfowl.

THE passage of this bill was one of the greatest steps which the game conservation movement has ever taken and already, though it has been in force but two years, reports from all parts of the country tell of an unprecedented increase in the numbers of our migratory birds. Enemies of conservation, nevertheless, have attempted to interfere with its usefulness by cutting the appropriation for enforcing it and have even attacked its constitutionality. During the past month, in fact, a test case has been brought before the Supreme Court of the United States to determine this point once and for all. If for any reason it should be found to be unconstitutional, let us earnestly hope that the difficulty can soon be rectified so that the protection which the present law affords will not be removed and so that we may continue to reap the benefits which we are already deriving from it.

One of the chief reasons for the great increase in the numbers of migratory birds following the enforcement of this law has undoubtedly been the clause prohibiting all spring shooting, so that birds that would ordinarily be killed in many states on their way to their breeding grounds now return in the fall with their young, causing, in some places, nearly 100 per cent increase.

The stopping of all night shooting is another very desirable feature of the law, for it gives the birds a chance to feed undisturbed after sunset and before dawn. If it could have included also a measure prohibiting the sale of game anywhere in the United States, the future of the waterfowl would have been assured. This, however, seems to be a state right and up to this time only seventeen states have availed themselves of the privilege of thus conserving our game for the common good of all. As Dr. Hornaday has observed, "The destruction of game birds by sportsmen is trifling in comparison with the slaughter by commerce," and this is obviously true when we consider the facts that a single market-hunter in the South has been known to kill nearly 4,500 ducks in a single winter and that each year over 150,000 waterfowl were formerly sold in the New York markets.

In this connection there is a clause in the game laws of most states limiting the number of ducks that may be killed in a day by each hunter. The number, however, is in all cases far too generous for the best interests of conservation. Those of New York, for example, noted for their saneness, allow each hunter to kill twenty-five every day of the season, if possible. This limit was designated in the days of the market-hunter and for

some reason has never been changed. Now the sale of game is prohibited and what family can dispose of 350 pounds of duck meat, the result of a week's shooting? Most sportsmen would be content to kill but eight or ten in a day, but so long as the limit is retained at twenty-five human nature is such that every hunter shoots the limit whenever possible, either to show his skill or to keep up with the "other fellow," and certainly it is conducive to the surreptitious selling of game among a large class of hunters.

IN ADDITION to the restrictions of hunting made by the Federal law, the Government has likewise set aside, through its provisions, protected migration routes along the three great rivers of the United States, the Ohio, Missouri, and Mississippi, where no shooting is allowed, so that some birds at least will find safe passage to and from their breeding grounds and serve as a permanent breeding stock for supplying other parts of the country.

But even more effective than these protected routes for the preservation of our waterfowl are the bird reservations, both private and national, which have been established. There now exist in the United States and its territorial possessions nearly sixty Federal bird reservations, where no shooting whatsoever is allowed, and many private preserves where shooting is greatly restricted. Some of the Federal reservations, the two in North Dakota and the one at the mouth of the Yukon in Alaska, for example, are in the breeding grounds of the waterfowl, while others, such as Breton Island, Louisiana, are favorite spots for spending the winter. These little oases are doing much toward preserving and increasing our ducks, geese and swans and other migratory game.

The way in which the ducks and geese recognize this protection and respond to it is very convincing of the practicability of this form of conservation, for within the protected areas the birds become almost as tame as domestic poultry, while outside of it the same birds are extremely wary. Even in other parts of the country, where there are no reservations, after the hunting season is over, the ducks respond very quickly to any protection shown them and will soon learn to come and be fed. Take, for example, the far-famed canvasbacks which a score of years ago thronged the Chesapeake and made it famous as a hunting resort but which today have almost deserted the region and have become extremely wild. On the lakes of central New York, where they are hunted only until the fifteenth of January, they are becoming much more numerous and after the hunting season, when they are often fed to keep them from starving, they lose their fear and flock along the shores for the corn thrown out for them. The bluebills, in the same region, birds that have been shot at for over three months, many of them bearing scars from ineffective bullets, before they leave in the spring will almost feed from one's hand.

THE future of the waterfowl is much more pleasant to contemplate than that of any other game. If the Federal law can remain and be properly enforced and receive the approving sentiment of all the people; if all the markets can be closed to the sale of game, and if the "bag limits" can be appreciably reduced, there is no question but that future generations will enjoy just as good hunting, if not better, than we of today. For even though the breeding grounds of the waterfowl in the United States are being more and more restricted by improved agriculture, there will always remain the vast areas along Hudson Bay and from there westward to the Great Slave Lake, into which agriculture will never penetrate, but which, with its lakes and marshes, is admirably suited to the needs of the waterfowl. This vast extent of territory will send each fall its great flocks of ducks and geese to the United States and the protected migration routes, the reservations, and the limited open seasons will cut down the numbers killed. In this way the breeding stock will remain unimpaired and the great army of hunters, each year receiving reinforcements, will still be able to find legitimate, health-giving sport about our lakes and marshes, and our government will be conserving one of its great national assets.

THE AUDUBON SOCIETIES

IT WOULD not be right to discuss the conservation of our wild life without mentioning the Audubon Movement, which has done more than anything else to bring about our present statutes and the establishment of bird and game reservations. The name Audubon Society was first used by Dr. George Bird Grinnell, editor of *Forest and Stream*, in 1886 and under this title began an organization for the protection of birds. The National Association of Audubon Societies was organized in 1905 with Mr. William Dutcher as president and Mr. T. Gilbert Pearson as secretary and financial agent, and the activities of the association under their direction have so increased that, as Mr. Ernest Ingersoll has written—

"The National Association of Audubon Societies is today a strong, far-reaching institution. Its platform is wide. While engaging actively in preserving wild life, it recognizes fully the claims of the sportsman, and has no fight with the man who legally kills game-birds and game-animals. In summer it guards, by means of paid wardens, virtually every important colony of sea-birds on our Atlantic and Gulf coasts, as well as on many lakes of the interior. It owns or leases many islands where ducks and sea-birds breed, and these places are wonderful bird-sanctuaries. It originated the system of Federal bird reservations, and cooperates financially with the Government in protecting them. It publishes and distributes annually over 6,000,000 pages of bird-protective literature, and the home office, where twenty clerks are engaged, has become a general clearing house for all kinds of information in reference to the study and conservation of wild birds and animals. The association is particularly active in legislative work, and has been responsible for the enactment of many laws for the establishment of state game commissions; for shortening seasons for shooting wildfowl and upland game-birds;

for prohibiting the sale of game; for destroying the traffic in birds' feathers; and in the capture of native birds for sale as cage-birds. It makes expenditures every year for the protection of big game, for feeding game-birds and song-birds in winter, and in prosecuting violators of the law."

BIRD LIFE IN NOVEMBER

NOVEMBER is the month of sparrows. The white-throated, white-crowned, fox and tree sparrows and the red polls and snow buntings have come down from the north and joined our resident species. Fields, hedge rows, lake shores and the borders of woods, overgrown with weeds, furnish abundant food, and the thick winter plumages of the birds are ample protection against the cold.

The frosts have killed most of the insects or driven them into hibernation, so that only a few of the insect-eating birds remain. These are the hardy woodpeckers, chickadees and kinglets that seek out the larvae where they are hiding for the winter or live upon the eggs

fastened to the bark and branches, and they will stay with us all winter.

Some of the blackbirds and grackles that have been feeding upon insects all summer have changed their fare with the coming of winter to a diet of seeds, and many of them are still with us. A few of the fruit-eating robins and bluebirds may still be around, and the fish-eating kingfisher and an occasional heron may likewise be seen. Practically all of the shore birds have left the northern states but the winter ducks like the old squaws, canvasbacks, golden-eyes, and mergansers, are just beginning to arrive in numbers.

Now is the time to begin putting out food for the birds. Fasten pieces of suet to the branches and trunks of trees and scatter chicken feed beneath the shrubbery in an effort to retain as many about the grounds as possible. In the December issue various forms of feeding devices and methods of attracting and taming the winter birds will be discussed, but November is the time to begin attracting the birds if you would have a large number around all winter.

Kill-dee

(*Plover*)

By H. L. JOHNSON

Wandering lost-one, ever at home
From Hudson's shore to Gila's strand,
Whither I will, there shall I roam.
Shot like a bolt from the Master's hand,
I love the mountains, I love the sea,
Hark to my cry, kill-dee! kill-dee!

Strong and brave, clean and true,
Sharp-angled wing, tendons like steel,
Fighting the storm or piercing the blue.
Mine the Supreme-gift, to live and to feel.
I love the marsh, abide with me,
Hark to my cry, kill-dee! kill-dee!

Gift of the Infinite, proof of God's love,
Lover of men and trusting them fully,
Lose not your faith in the power above,
Take then my message, trusting it wholly,
I bring you friendship, slay not me,
Hark to my cry, kill-dee! kill-dee!

Lost in the storm, weary and spent,
I pause for a breath in the city's glare,
Or drop for a while in the woodsman's tent,
Living like him, great toil, humble fare.
God's great outdoors for him and me,
Hark to my cry, kill-dee! kill-dee!

Eternal wanderer, never at rest,
Wanderlust ever, faithful to nature,
Optimist always, somewhere to nest,
Braving the present, no fear of the future,
I love all men, mate, I love thee,
Hark to my cry, kill-dee! kill-dee!

Logging Rasak and Lagan

By T. R. HELMS

LEAVING Singapore, one of the coastwise steamers of the Koninglijke Paketvaart, which calls at Singapore every two weeks, proceeds up the Straits of Malacca, and stops at Penang, where she takes on the mail brought by European steamers, for the west coast of Sumatra. The steamers of the Paketvaart, being of light draught, enter the harbor of Penang by the South Channel, just as the German cruiser *Emden* did, when she destroyed a Russian and a French warship early in the war. All steamers of heavy draught enter the harbor by the North Channel and leave the same way. Leaving Penang, the steamer goes west to Sabang, an important coaling station on the Island, Palo Way, which is situated off the extreme northern end of the Island of Sumatra. The harbor of Sabang is very much up to date; it has a good wharf and very modern coal sheds, and traveling electric cranes for unloading coal from vessels into the sheds, or vice versa.

From Sabang the steamer goes to Oleh Leh, which is the port of Kota Radja, the capital of Acheen, which lies about four miles inland. After leaving Oleh Leh and calling at Meulaboh and Tampat Toeon, the steamer

strikes out west for the Island of Si Maloe, before reaching which the captain of the steamer is apt to remark that it rains all the time on Si Maloe, and that this great rainfall is caused by the dense and heavy growth of timber with which the island is covered.

It appears that the people on the other side of the earth also connect forests and rainfall, on which subject so much has been written in this country.

After leaving Oleh Leh and viewing the shores of Sumatra and outlying small islands, there are to be seen numerous rocky, barren little islands. In the dry season the extreme northwest coast of Sumatra looks in most places barren and uninviting, but when after a seven days' trip from Singapore, the steamer arrives at the Island of Si Maloe, everything is green, no bare, barren land is to be seen, every little coral bank or island, no matter how small, is covered with vegetation. It is one of the greenest spots on the face of the earth. It is not subject to wet and dry seasons in the sense that some other tropical or semi-tropical parts of the earth's surface are, but has a heavy rainfall most of the time. On the main Island of Si Maloe are three good land-locked bays,



RASAK LOGS

These were cut on the island of Si Maloe, called by the Dutch Eiland Sinaloer, which is off the northern coast of Sumatra in the Indian Ocean. A peculiarity of the Rasak trees is that nearly all the mature ones are rotted in the center, but the wood cut from the sound portion is valuable and in demand. Si Maloe is said to be the greenest spot on earth.

which are good harbors. At the northern end is Sibigo, in the central part is Telok Dalam, and on the southern end is Sinabang. The Paketvaart steamers call at all three places, and bring supplies and take out timber. The island is part of the State of Acheen. The Achinese conquered the island and established themselves there,



OEY KON SEN AND HIS WIFE

Mr. Sen is the Chinese manager of the timber company's store at Sinabang, and is a capable and progressive man. His wife is half Chinese and half Malay. Her costume is that of the native Javanese of the better class.

but large numbers of the original inhabitants are still found on the island. In a convention between Great Britain and Holland, concluded in 1872, Great Britain acknowledged Holland's sovereignty over Acheen, and Holland immediately asserted its sovereignty; but the Achinese offered strong resistance. After a bloody and uncompromising war, which lasted from 1872 until 1909, the Achinese were subdued, or rather exterminated, and the country is now being repopulated with Malays and Javanese. The Nederlandsch-Indische Government is spending large sums of money to build up the country again, and to develop the natural resources and encourage trade and commerce.

The Nederlandsch-Indische Government owns and controls the mineral and timber resources of all its territory, and with the conquest of Acheen the timber of the Island of Si Maloe came under Government control. The Government gave concessions to two different companies, one at the northern end and one at the southern end, to exploit the timber of the island, under Government regulations. The two principal commercial timbers of the

island are Rasak and Lagan. Rasak is a very hard and very heavy timber, and is considered next to Teak in firmness and lasting qualities. The trees grow large and tall; it is common to see them 100 feet up without a limb. Next to the shore all around the island younger Rasak trees are comparatively sound, but in the interior most of the old, and a large percentage of the younger trees are defective in the heart. The large trees invariably are hollow. The reason assigned for this is, that on the shores the trees have light and air, but in the interior the air is excluded by the dense growth of the tropical vegetation, which also prevents the penetration of sunlight, and consequently the moisture caused by the heavy rainfalls causes the trees to become defective.

The Lagan timber is a softer timber, which also grows to large size, but is not as lasting as Rasak, when exposed to weather. It also checks very badly when it seasons, and the checks start from the heart to the outside. A stick of timber with the heart in, is virtually quartered at times after it has seasoned; but sawed into boards or dimensions that do not contain any heart, it makes fine lumber for interior work, and some species greatly resemble Mahogany. Unlike the Rasak, which starts to decay from the inside, but outside of the inner defects is absolutely sound and firm, the Lagan starts to rot and decay from the outside when its time comes, and the rot penetrates the whole tree. The topography of the island is very rough and uneven; the surface is largely irregular hills and knobs of every conceivable shape, and between these knobs and hills is swamp. The island is shaken by earthquakes at the interval of approximately twelve days:



KARINAH AND BATTIE

Two Javanese women residents of Sinabang in their native costume. Note the cut and the pattern of their skirts. The buttons, which are as close together as they can be sewed on Karinah's waist, twelve in all, while Battie has but five, are British pounds.

that is, about every twelve days there is a quake of more or less intensity.

The Rasak and Lagan timbers grow only on the high ground, and in the swamps grows an impenetrable mass of useless timber and vines. Rattan is very plentiful and large quantities are exported. The natives have been cutting the smaller and sound Rasak trees around the bays for a long time, have hewed them square, and shipped them to markets, but the problem of getting big timber of the interior cut, is difficult. One of the companies has started to build a railroad, and has purchased regular Pacific Coast logging equipment of the heaviest type. This handles the logs all right, but the building of the railroad presents great difficulties and costs an exorbitant, almost prohibitive, price. They cannot follow a valley, because there is none, and they cannot follow a ridge, because there is none, and all they can do, is to bridge from one hill to another. Fills are almost out of the question, because the nature of the soil is such, that the heavy tropical rains wash the dirt away almost as fast as it is put there. To reduce the large logs to mer-



BUTT END OF RASAK TIMBER

Loaded on a car in the yards of the company on the Island of Si Maloe, Dutch East Indies. This company has the concession for cutting this timber granted by the Nederlandsch-Indische Government which controls the timber and mineral resources of the country.

chantable size, that is, to cut all the sound parts of the logs from around the defective center, the company has put in one of the largest type Pacific Coast band mills. The company has also evolved a plan of seasoning the timber in fresh water, thereby increasing its lasting qualities, to keep it from springing, when it is sawed later into smaller dimensions.

An extensive system of basins has been built and fresh water flows through them. When the timber leaves the mill, it is loaded by an overhead traveling electric crane of ten-ton capacity on railroad cars and taken to the basins. Alongside the basins are the railroad tracks, and the tracks of the traveling electric driven derricks of ten-ton capacity and a reach of forty-five feet, to handle the timber from cars into the basin and vice versa. After the timber has been in the basins six months or longer, it is taken to the dry sheds, where it is also handled by elec-



YOUNG JAVANESE WOMAN

This young lady is a representative of the type of Javanese in the Dutch East Indies. The writer of this article says the Javanese are closely watched by the Nederlandsch-Indische Government officials in the fear that they may learn more than is desired about the military defenses of the islands.

tric driven overhead traveling cranes, and stacked up for drying. On account of so much rain and damp weather no timber or lumber is stacked outside as is done in this country. It might also be noticed, that nobody on the island seems to be afraid of fire. No forest fires are possible as everything is always green, and the tree-tops and limbs from the trees that are cut down, are kept so wet and soggy by the constant rains, that they could not burn.

The houses and buildings are also so damp and moist, that it would be hard to set them on fire. On account of so much rain, the ground, although it has the appearance of rich soil, seems to be sour, and no vegetables grow. The only grass that grows is a coarse variety, with no nutritive value. A horse or a cow would starve on it, and consequently no horses, mules or cows are kept on the island; but there are "kerbow" (Water Buffalo) with tremendous horns, and goats and wild hogs are plentiful.

While Si Maloe is a very green island, it is not a flowery island. It is rare to see a flower or a blooming tree; although in tropical countries as a rule, plants and trees bloom in profusion. The wet climate, with little sunshine, seems to account for the absence of flowers. The mechanics employed in the construction

work, such as carpenters, blacksmiths and machinists, are Chinese, but all the operating work is done by labor imported from Java. Malays do the clerical work, do all surveying and make maps, and also make all drawings for mechanical work. The employes of the company are all housed and quartered on the concession of the company and the different houses and buildings of the company present quite a town of itself, in which the company must maintain streets, sewers, water, etc., at its own expense, and is subject to all sanitary rules and ordinances that the Governor of the island may prescribe.

The town of Sinabang proper is controlled by the Government and maintained by it. The town has fine wide streets lined with shade trees, it has electric light, telephone service, police and fire departments, a customs house, post and telegraph cable station, and a barracks for native soldiers. Sinabang is also the seat of Government of the island and usually the Governor is the only white man residing in Sinabang proper, all other Government officials are either half-castes or natives. The religion of the inhabitants of the island is Mohammedan. There is not a single Christian church or preacher on the island of Si Maloe.

Traveling on one of the coastwise steamers of the Paketvaart the stranger will notice that the Malay language is the official language on board ship as well as all over Nederlandsch-Indie. It will also be noticed that the first and second-class accommodations are located on the bow and stern of the ship, while the middle section of the ship is reserved for deck passengers and cargo; which arrangement is the reverse from American and European steamships, where the first-class passenger accommodations are located amidship. On the boats are also private kitchens, both for Chinese and natives, where those who do not consider "clean" the food they receive from the ship, can cook their own food in their own manner. After listening, on American and European steamers, the class that carry cargo as well as passengers, to the rattle and noise of the steam wenches, when cargo is discharged or taken on, it is quite a novelty to find some of the coast steamers of the Paketvaart equipped with electric hoisting apparatus, which works absolutely noiselessly.

As mentioned before, the Government of Nederlandsch-Indie owns all forests and employs a staff of Government foresters for the management of the forests of the country. The Government grants concessions to private companies for the exploitation of certain tracts, but in 1914 the Government cancelled all concessions for cutting Teak in Java, to take effect January 1, 1916, and on that date the Government itself intends to assume all the operations of exploiting the Teak timber in Java on its own account. In other words, the Government intends to go into the timber business, as far as Teak is concerned, and derive all the profits itself. Government ownership and control of forests seems to take a strong hold in the Far East. The representative of a timber company in Siam remarked, when he investigated the merits of

Pacific Coast donkey engines for dragging logs out, that they worked very well, but they would not suit his business. In the first place he could cut only those trees that were marked out by the foresters, and further, he could not cut other trees for fuel, and he would not dare to injure any trees when he removed the logs that he had cut, and which he would be very apt to do if he dragged the logs through the woods by means of a donkey engine.

GIANT PINE AT UNUSUAL ALTITUDE

AT AN altitude of 10,000 feet in the temperate zone it is generally assumed that there is little timber, at least nothing that is worthy the name. In California, however, are found many things not supposed to be so. The photograph, taken by Geologist G. K. Gilbert, of the United States Geological Survey, shows an enormous pine tree growing at this elevation, a tree which in point of size and vigor would be a credit to any altitude and latitude. The tree is a specimen of mountain pine—*Pinus monticola*—which is nearly 6 feet in diameter at the base. It was photographed by Mrs. Gilbert on the south slope of Mount Hoffman, in the Yosemite National Park.



ANOTHER OF CALIFORNIA'S SURPRISES
A giant pine, growing 10,000 feet above the sea. The gentleman standing beside the tree is 6 feet 2 inches tall.

Forest Relations between the East and the West as the East Hopes to See Them

ADDRESS OF HENRY STURGIS DRINKER, LL.D.,

President of Lehigh University and President of the American Forestry Association, on American Forestry Association Day at the Panama-Pacific International Exposition, October 20, 1915.

LUMBERMEN AND FORESTERS OF THE GREAT WEST: We who have come from the East to join you in this conference greatly and deeply appreciate your welcome because we see in it that the American Forestry Association has been taken into fellowship by practical men of the West who know well how forestry organizations can lack in practical utility and therefore not be worth consideration on busy occasions. The compliment is accentuated when the president of the American Forestry Association is asked to preside on a day like this devoted to fundamental industrial conditions. It shows recognition on your part that forestry, on its practical useful side, means forest industry, and that we have mutual recognition of this truth. We of the East do recognize it, and we wish to work with you to make the whole country recognize it, and I am glad that you have given us this chance to learn your views as to what is needed so that we can do our best in this joint national work.

The American Forestry Association is an organization older and perhaps more influential than you of the Pacific Coast fully realize. It led the early forestry movement in the country as "The American Forestry Congress," organized in 1883, later reorganized in 1890 as "The American Forestry Association." It has about 9,000 members. Its magazine has a very large circulation compared with that of the ordinary industrial publication. Far more than in most educational or industrial organizations, it includes both the people inside the movement—such as lumbermen, foresters and public officials—and the outside public which needs education and guidance. Commonly, I think, organized effort represents one class seeking to correct or restrict the other, with the confidence of but one. We, more luckily, embrace both, but this also gives us the greater and more difficult responsibility of representing the interests of both. It is not always easy to do this with justice and it is still harder to satisfy both that we are doing so.

There was a time in America when to the lay mind forestry meant forest preservation only, and I think you will concede that it meant the same to lumbermen. There was little meeting on common ground. It was in those days that the American Forestry Association was born, and for a time it was governed by such an attitude. We can hardly criticise it for this. There was need of forest preservation and there were few to enlist except those whose understanding did not extend beyond the duty of

state and government to prevent useless destruction. They knew no way except to denounce and command. Nor did forest industry join them to show a better way. They were sincere but ignorant. Let us be fair, however, and admit that although ignorant they were sincere. And this view is still, of course, to some extent held by uninformed emotional people, who know and think little of forest industry, and view the question only from an aesthetic standpoint, the desire to preserve trees for their beauty or poetic association.

However, as the study of forest conditions progressed, a change took place. Outside of those pioneers, whose viewpoint and activity left a strong imprint on the public mind, grew up an element which was perhaps less altruistic, less public-spirited in its detachment, but also less fanatical, if we may use so strong a word, not in a critical sense, for the out-and-out reformer must be somewhat of a fanatic to keep up his courage and to be heard. But the new forestry was more practical. It appealed to justice more than to prejudice, to common sense more than to responsibility to posterity. It recognized the use of forests more than sentiment and that their use lies in service rather than in being an end in themselves.

At the same time lumbermen, in trying to preserve and foster their industry, came to see the necessity of protection and conservative methods. Unconsciously at first, both elements arrived by independent thinking at about the same conclusion—that practical forestry is forestry to the extent that pays, or at least is financially permissible under prevailing social conditions. Lumber producers called it intelligent timber management, the others interested called it forestry. And soon these naturally sympathetic elements made each other's acquaintance, and began to work together, with names and differences forgotten. That was the birth of real American forestry, the kind that will be as nearly successful as success is attainable. The Western Forestry and Conservation Association stands before the country as one of the first and foremost exponents of this sane modern view. Its alliance of private, State and federal interests in those things that can be done together for mutual and public good has set an example to the United States and Canada that is being widely followed. The American Forestry Association cannot work along exactly the same lines, for it mainly represents forest education and moulds opinion, and you represent a membership owning and

managing large forest resources, but it follows the same general principles.

It has not been an easy struggle to reach this broad standpoint. An organization which contains all elements, East and West, contains many viewpoints to reconcile. We are not immune from factional dissensions when such controversial matters as states' right, national control, water-power, and the development of Alaska align our people into different camps who would wish to commit the Association unreservedly to their factional views and are far from satisfied with neutrality. And you must remember that in many Eastern States there is nowhere nearly the accord between lumbermen and foresters that your organization has brought about on this coast. The old misunderstanding still clogs progress. The old and narrow conception of forestry is not dead, and its exponents have honor and following, and, on the other hand, there are members who are not disposed to be liberal to their purely nature-loving brethren and who can look on forestry only from a narrow standpoint. The American Forestry Association has, however, insisted for several years, and I hope will permanently do so, that the Association as an institution shall stand without timidity for those sane practical improvements in forest conditions that producer and consumer can and must work for to mutual advantage. It recognizes that forestry is an industry limited by economic conditions, and that private owners should be aided and encouraged by investigations, demonstrations and educational work, since they cannot be expected to practice forestry at a financial loss. It urges forest taxation reform, removing unwise burdens of taxation from owners of growing timber. It believes in closer utilization, in logging and manufacturing without loss to owners, and in aid to lumbermen to achieve this. It demands equal protection to the lumber industry and to public interests in legislation, recognizing that lumbering is as legitimate and necessary as the forests themselves.

To these ends the Association devotes its publications, its committees, and its other means of influence. But it also realizes that to do so intelligently and effectively it must be competently advised. This is why its officials and directors include not only State and federal officials and men from forest schools and laboratories and leaders in finance and business, such as C. F. Quincy, of New York, and also such men as Col. E. G. Griggs, of Tacoma; Capt. J. B. White, of Kansas City; Joseph N. Teal, of Portland; Col. W. R. Brown, of New Hampshire; Charles Lathrop Pack, of New Jersey; J. E. Rhodes, of the Southern Pine Association; E. A. Sterling, of the National Lumber Manufacturers, and E. T. Allen, of your organization. And in its advisory board are representatives from the Northern Pine Manufacturers, the National Box Manufacturers, the National Wholesale Lumber Dealers and half a dozen similar trade organizations.

This leads me, after perhaps too long a preamble, back to my title—the relations between Eastern and Western organizations as we hope to see them. By no means is

the American Forestry Association to be considered Eastern. It is not so in spirit. Only accident, which you should remedy, makes it so in proportionate membership. But to the extent that you consider it so because of this membership, let us classify it with Eastern organizations who can extend assistance to the West through closer relations.

As I see it, forestry and forest industry alike and together are in the travail pains of a new birth in public economy. The titles of talks to be made here today, at a forestry meeting, are more significant than anything I can say. Everywhere we see the same urgent need being emphasized—the need first for analysis of a recognized weakness, second for giving this analysis wide publicity, and third for help in applying some new and radical remedy.

If this is true, we must work together. Whether it be in Congress, in individual States, in the public mind, or in the minds of lumbermen and foresters, every move which affects this situation affects forest welfare both East and West. Successful solution of the problem will be hard enough to reach at best. It is beyond hope if the public mind and the legislative mind is confused by counter-claims and accusations purporting to represent consumer against producer, forestry against lumbering, government against industry, State against individual, and East against West. West and East united will be potent in influence and in power for good and by thorough mutual understanding and cooperation we can do much to forward our common interests.

I have not time to catalogue all specific illustrations, but a few will show what I mean. Take questions of national legislation. I believe it the duty of forestry organizations to teach the fundamentals of forest economics, to urge a national forest policy which shall make the most of all forest resources, public or private, both as a source of supply to the consumer and as employment for industry. This involves the disposal of public timber, national and State, in competition with private timber; it involves the terms under which the industry may organize to accomplish economical distribution and disposal of product, and, it doubtless involves complicated questions of domestic and over-sea transportation. How can you and we use our respective influence in these matters patriotically, wisely, and to the best effect without closer cooperation than we have today?

Or take State legislation. The influence of State legislation is not confined to the borders of the State enacting it. Eastern State legislation is liable to affect either your business in that State, or it may afford a precedent for legislation in your own State, or in some way have a reflective influence on interests in your State. This is equally true of strictly forestry legislation and of industrial legislation under which forest products are manufactured or sold.

Or take the expenditure of public moneys, whether by States or by the nation. Appropriations for the protective work of the Forest Service in the West, or for State protection or the purchase of cut-over lands, are matters

of public interest in which no State escapes the example or influence of others. I need only mention the Weeks law, familiar to all of you interested in forest protection. Originating with the purchase of National Forests in the Atlantic States, it provides funds for needed State and Federal cooperation everywhere. This work is of great importance, and this legislation as valuable to you in the West as it is to us in the East, calls for support and extension, and it should have your influence and support with your representatives in Congress this winter.

Tax reform is another matter in which uniformity of effort to a certain extent, yet with recognition of differing conditions, demands both active and concerted attention. It is one in which distance little affects the benefit or danger of precedent. Neither section should ignore the other in its activities.

The education of the public in wood and its uses is another exceedingly broad subject. Just as the West has much to gain from the permanent establishment of wood as a desirable material for Eastern consumers, so has the East to gain from public knowledge that the West can keep up the supply indefinitely, and that lumber will not become so scarce or expensive in the near future that the study of substitutes is imperative. Eastern forestry organizations can do more to spread these facts where

they should be spread than you can, but to do so effectively they need your support and your information.

In the great conventions and congresses throughout the country, and in smaller ones too, where public sentiment is influenced, there is great need that the forestry viewpoint be presented always intelligently and concertrately for our common good, and nowhere is there more conflict of influence due to lack of knowledge by each section of the problems affecting other sections.

My plea is for closer relations between us. Great and successful as you are in your work out here, and high as is the standing it has given you from ocean to ocean, I cannot believe you are quite beyond the need of our help. It has been and will be freely yours. The magazine of the American Forestry Association is glad to tell the story of what you have and what you want. Our councils and our voice welcome your suggestions. And we need your help. We have proved our sincerity by sending our representatives to make this long journey merely to be here and to hear your problems discussed, and to exchange views with you. We are amply repaid and shall be still more so if from this meeting shall come a more intimate and systematic mutual support in the work we are doing together for the welfare of American forest industry.

A Trip on the Apache National Forest

By A. P. W.

RASTUS has gone," cried the Supervisor, as we were trying to get an early start on a pack trip. "Picanniny," the other mule, was having the grain loaded on him preparatory to finishing with a diamond hitch when Rastus lifted the turnstile and out into the garden! 'Mid much cussing,—the tramping down of my pet mint bed (used in making juleps), he was roped.

Off we started to make 30 miles that day, "Sandy,"

the Airedale, and "Jock," the collie, barking and cavorting at every step.

With us was a tenderfoot,—an office man. He bumped along,—his constant questions being, "How far did you say it was?" "How many miles have we gone?"

I wonder if you know about the timber on the Apache National Forest. First juniper and cedar groves starting at an altitude of 7,000 feet, fragrant, the sun oozing out the odors and filling the air with perfume. A little



THE BURROS

The Deputy Supervisor's wife and the pack train which carries "chuck" to the fire guards at lookout points.



ON THE ROAD—LOADED

A portal near Fish Creek on the Apache National Forest which covers 1,276,400 acres.



THE BURROS

Rastus and Pickaninny in the foreground loaded with the packs for the fire guards.



ON THE WAY TO THE SUMMIT

The pack train loaded with supplies crossing the White Mountains, Apache National Forest.

later, also higher,—for we were then getting about 8,000 feet above sea level,—yellow pine and their babies, the "black jacks," straight, commanding, and the leaves rustling in the cool June breeze. Our ponies stopped to refresh themselves from a cool mountain stream as they neared the mountain foothills. We then came to a wonderful open meadow. To our left the snow-clad "Baldy," to our right and in front of us interesting knolls. On one, the ever-vigilant fire guard. We signalled to him in passing. After crossing the mountain meadow, we started to climb the real mountain, "Baldy," entering groves of cork bark fire, blue spruce and aspen nodding to us from an old burn.

Ascending to an altitude of 11,476 feet, we came, in a tiny open park, upon Uncle Sam's ever-welcome sign that he is on guard, the flag, floating from a pole attached to the lookout cabin. It is bachelor headquarters, but no woman could have her house cleaner. A tiny stove, shelves for "chuck" and dishes, aspen poles for a bedstead and spruce boughs for a mattress. Here the guard spends two months from June 1 to August 1.

We left our horses and climbed through snow drifts 6 feet deep to the summit where we found the guard scanning the country for any possible smoke. A protractor is on top to give readings of any fire and its location into the supervisor's office by phone.

"What was that?"

"Is that smoke?"

A quick survey through the glasses, a squint through the needle of the protractor, located the fire at 1.30. Rushing to the telephone, the guard called up other lookout points to ascertain cross readings. Then he telephoned in to the office. He ascended the summit to keep the office posted. (The lookout guard reports fires, the patrolman goes to them.)

We rushed to our horses,—went down in twenty minutes what it had taken us over an hour to climb, "Rastus" ready to kick at anyone and anything for making him hurry. We reached the fire, a distance of 10 miles. Found campers had left their noon fire without extinguishing it. Saddles, beds, "chuck," everything gone. The patrolman had been notified, so with combined efforts it was put out after twenty acres had burned. The



OPPOSITE BLUE RIDGE RANGER STATION

One of the big bluffs on the Apache National Forest in Arizona.

supervisor on looking up, noticed a sign that had evidently escaped the notice of the campers:

"EXTINGUISH YOUR MATCH, CIGARETTES
AND PIPE ASHES.
HELP PREVENT FOREST FIRES."

The campers shared our chuck and beds. It was necessary to enter a trespass case against them according to law. I doubt if they leave a fire again with even warm coals.

In the meantime, I had almost forgotten our friend, the tenderfoot. He was grumbling, peevish and wanted to return. The ride was too much for him, he had seen enough, ridden too much. So, the next day, "Rastus" in the lead, we started for home, the landscape offering rare pictures to be taken, but our friend was headed, as "Rastus," for home and a sure-enough bed.



PAT KNOLL FIRE LOOKOUT TOWER

WHITTIER'S PINE TREE

By AGNES L. SCOTT

THE famous pine tree, which stands in the wood-glade on the Sturtevant farm, near Sunset Hill, Center Harbor, New Hampshire, bears the name bestowed by the poet Whittier, who dedicated it under its shadows as the "Wood Giant," 1886, but which now is called "Whittier's Pine Tree."

Among the scattered groups of pines, Whittier's tree stands compact like a silent patriarch, with a splendor all its own. Its chief character is its magnificent strength, enormous trunk and powerful boughs that give it the appearance of a giant.

The Sturtevant farm is where Whittier passed many happy summers. Every morning before breakfast the



From a Sketch by C. Scott White.

WHITTIER'S PINE TREE

This pine, standing at Center Harbor, N. H., was a great favorite of the famous poet who dedicated it as "The Wood Giant," in 1886.

poet would walk through the paths leading to the center of the woodland, and in the shade of his loved tree, watch the glorious sunrise. Here he saw to the east the Cardigan Mountains; to the north, the Sandwich range; to the west, the Ossipee range; and here he saw the beautiful broad view of Squam Lake with its green wooded islands.

It was in the twilight hours that the saintly poet loved to stand under the shelter of his favorite tree and watch the mountains bathed in sunset glory. Here he surrendered himself to the mountain mystery, and his soul received the calm and strength from the glorious hues of the sun-dropped splendor as the twilight deepened around him.

As surely as he loved the mountains, he loved the wild flowers, the singing birds and flowing brooks. Of the wild flowers the golden rods were his favorite, and these he gathered in his walks by the roadsides and in fields.

It was in the large, roomy house on the Sturtevant farm, that the Quaker poet entertained the neighbors and children. A delightful companion even to mere surface acquaintances, and naturally sympathetic to all sorts of people. He always greeted everyone, never waiting to be introduced, with the accustomed greeting: "How does thee do?"

Those who have been entertained by the poet at the farm will never forget his cheerful manner, and large geniality, and his frank, straight gaze of penetrating eyes—eyes black as night which shone with that big elemental humanity. One noted the poet's seriousness and his love for goodness and truth. Everybody in New England has felt the kindly words of the sage in all he wrote, but the friends who have come in close contact with him amid the scenery of the Northern mountains can feel and understand the man best, and throughout all his poems is that serene enthusiasm for the mountains.

PROCEEDINGS—OPENING OF THE FORESTRY BUILDING AT CORNELL

IT HAS just come to the knowledge of the Department of Forestry that certain persons whose names appeared on the mailing list failed to receive copies of the pamphlet containing the Proceedings at the Opening of the Forestry Building on May 15, 1914. In this pamphlet are also given the addresses delivered at the open meeting of the Society of American Foresters on the following day.

Anyone who desires a copy of this pamphlet may obtain it by addressing Professor Ralph S. Hosmer, Department of Forestry, Cornell University, Ithaca, N. Y.

PROFESSIONAL PAPERS AVAILABLE

AMERICAN FORESTRY has been informed by the Director of the United States Geological Survey that there is available, for free selected distribution, a supply of five different professional papers on forestry. AMERICAN FORESTRY will be pleased to furnish forestry professors, forestry students, or any one especially interested with the following illustrated volumes, free of any charge:

Professional Paper No. 22: "Forest Conditions in the San Francisco Mountains Forest Reserve, Arizona," by J. B. Leiberg, T. F. Rixon, and Arthur Dodwell, with an Introduction by F. G. Plummer. 1904. 95 pp., 7 pls.

Professional Paper No. 23: "Forest Conditions in the Black Mesa Forest Reserve, Arizona," prepared by F. G. Plummer from notes by T. F. Rixon and Arthur Dodwell. 1904. 62 pp., 7 pls.

Professional Paper No. 29: "Forest Conditions in the Absaroka Division of the Yellowstone Forest Reserve, Montana, and the Livingston and Big Timber Quadrangles," by J. B. Leiberg. 1904. 148 pp., 3 pls.

Professional Paper No. 30: "Forest Conditions in the Little Belt Mountains Forest Reserve, Montana, and the Little Belt Mountains Quadrangle," by J. B. Leiberg. 1904. 75 pp., 2 pls.

Professional Paper No. 33: "Forest Conditions in the Lincoln Forest Reserve, New Mexico," by F. G. Plummer and M. G. Gowen. 1904. 47 pp., 12 pls.

Children's Department

Devoted to imparting information about trees, woods and forests to boys and girls so that they may grow to know how necessary trees are to the health, wealth and future of their country.

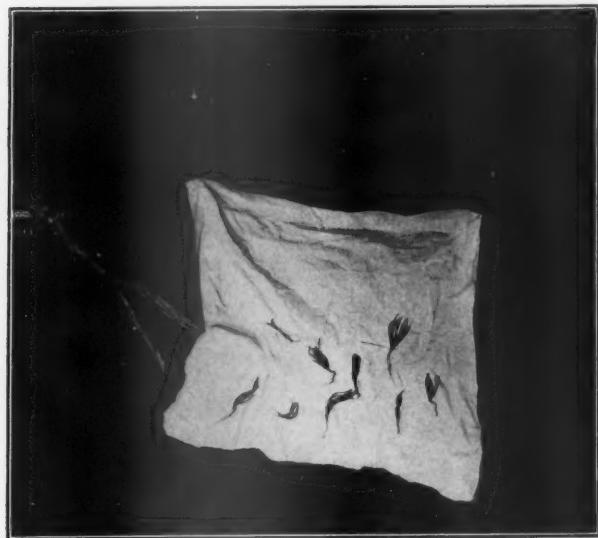
BY BRISTOW ADAMS

THE SPROUT GROWTH OF TREES

WE HAVE seen how new trees are started through seed from the old ones, and how tree growth may be extended from one place to another by means of these seeds. Seeds, however, are not the only source of new growth, because many trees are able to send out sprouts or shoots, and thus get started anew. By means of this power to sprout from the roots, some trees are able to renew themselves after the parent tree is cut down; and the forester takes advantage of this power or ability, in renewing the woods.

The capacity to sprout is not shared by all woods, and as a general statement it may be said that the cone-bear-

article. Some of the pines have been known to sprout from the root after the tops have been apparently killed by fires, and though this is not general it has been noted as occurring over the so-called pine barrens of southern New Jersey, where forest fires have been permitted to run through year after year until now the growth is scattered, and of little value. Northern arborvitae or white cedar sometimes reproduces itself, in the swamps in which it grows, by the process known as layering. Branches on the ground become overgrown with moss, and soil forms about them. These covered branches then send down roots and a new tree may be formed at the tip of the layered branch, with its own root system. Then the branch between the parent trunk and the point of layering may decay and the new tree take up its independent life.



YOUNG PINE SEEDLINGS

These are smaller, more delicate and tender than young grass. Even the slightest forest fire means their complete destruction.

ing trees, such as pines, spruces, firs, and the like can not and do not sprout from the stump; so that when they are cut down they are gone for good, and can be renewed only through seed. Since seedlings of cone-bearing trees are so tender, being smaller and more delicate in their structure than young grass, the importance of keeping forest fires out of pine woods can be readily seen. Even the smallest of fires just barely burning in the pine needles will set back new forest growth for a great number of years, possibly ten or more, because most conifers bear seeds in abundance only at intervals of several years, and even when such seeds are borne, conditions are not always right for their springing to life. But more will be said of forest fires and of their effects in a later

THE most notable example of the sprouting of conifers is undoubtedly that of the California redwood, one of the largest and tallest trees in the world. It sprouts readily from the stump, and there is evidence, even in trees which are full grown and many times as thick as a man's body, that they started as sprouts around a parent tree, which either through accident or decay lost its place in the forest and gave way



A STAND OF YOUNG PINE TREES WHICH HAS SPRUNG UP NATURALLY UNDER SEED TREES, WHICH HAVE BEEN LEFT

An example of how the German foresters take care of their timber and make sure of a new growth to take the place of that which has been used.

to a perfect circle of younger trees around the spot on which it stood. It would be possible for foresters to renew a redwood forest through the sprout growth, and there are now on the hills in the neighborhood of Redwood City, California, fair sized growths of redwood trees which have come up since the lumbermen cut off the timber fifty or sixty years ago. Usually, however, foresters depend upon standing trees to furnish seed for the new growth of cone-bearing trees; when there are no trees to furnish such seed they plant the seed in beds and raise the seedlings to be planted out where the trees are to stand in the forest.

In Germany, foresters have done much toward raising new forests by leaving the older trees to furnish seeds, and under these trees, when fires are kept out, the little new ones will come up as thick as they can stand together.

Almost all of the broadleaf or hardwood trees, including most of those which lose their leaves in the fall, will sprout from the stump or the roots when they are cut down. Some of them will sprout more readily than others. Hickory is one that is always likely to sprout, and sprout-growth or second-growth hickory is considered better than that from the older trees which develop from seed, because the sprouts grow very rapidly on account of the stored-up life in the roots of the old tree; and the more rapid the growth which a hickory tree makes, the more likely is the wood to be tough, strong and elastic. Chestnut trees also sprout readily, and the strong, straight sprouts furnish better material for telegraph and telephone poles than the older and more branchy first growth trees. Basswood or linden is another tree which sprouts readily.

Where there is a forest of useful broadleaf trees, which can be depended on to grow from sprouts, there is little need for seed trees, and such forests can be managed on what is known as a coppice or sprout growth plan. This plan is carried out in Europe, where there is a demand for small faggots for fuel wood and for the making of charcoal. In England, for example, there



A CIRCLE OF REDWOOD TREES

Each one of them is many times thicker than a man's body. They have evidently come up around the stump of a much larger parent tree.

are many such tracts, or copses, given over to the production of this kind of wood.

BASKET makers depend on this sprouting capacity for the willow reeds from which hampers and baskets are made. Each year the willow trees are cut back, either at or near the surface of the ground, or else at the top of a short trunk, and the new straight sprouts, when peeled and bleached, furnish the material for all sorts of basket work. Baskets, by the way, furnish one of the oldest forms of carriers known to man, and are still among the best of such forms for lightness, strength and cheapness.

The willows, some of the poplars, and other quick-growing, moisture-loving trees will grow from detached pieces. New sand bars, in rivers along which willows grow as the Mississippi, soon become covered with willow trees, which have started from branches that have floated down stream and have stranded on the bar, becoming partly bedded in the moist sand; or even while they are in the water they begin to sprout and soon send roots down into the sand and leaves and branches up into the air.

Growers of basket willows take advantage of this property and new willow plantations are set out each year from cuttings or short willow sticks set in the ground and kept moist.

Sometimes this ability of the willows to sprout causes unexpected results. A farmer, not far from the Luray Caves in Virginia, wanted to bring the waters of a spring up on the mountainside down into his dooryard. He ran a line of pipes underground from the spring to the back porch of his house and there set up a log which he had hollowed out to a point about three feet from the ground, where he bored a hole and inserted a hollow wooden spout or plug. The water ran from the spring and came out through the spout a good deal like the spout of a pump only it ran constantly, and there was no need for a pump handle. This pump-stock had not been in use very long before green branches reached out from the top of the stump, and in a comparatively

few years the clear living water was flowing steadily out from a living tree. It continued to grow, and in fact, grew so thriftily that the persons who own the place have been compelled to put in a new and longer spout because the tree, increasing its girth, threatened to grow around and over the original spout.

These various ways which the trees have of renewing their growth show that they are not entirely dependent upon seed. They also show that the trained

forested must know the habits and history of each of the trees with which he has to deal. Of course, this is only a part of the forester's knowledge, because he not only has to know how to make trees grow in the best way, but he has to know what kinds of trees are the most useful for various purposes to which wood is put. It can be seen, therefore, that to be a successful forester one needs to know pretty nearly everything that can be known about trees and their uses.

Wood Preserving Department

BY E. A. STERLING

The Modern Application of Wood Preserving Methods—Various Treatments and the Use of Treated Woods

TEN years ago maple was practically unknown as a railroad cross-tie, being included in the list of woods that decayed too quickly for this purpose. Today it figures quite largely under the head of "miscellaneous hardwoods," while in some regions it constitutes a considerable percentage of the ties treated. Clear hard maple is too valuable for flooring and other purposes to be used for ties, so for treatment the tops and smaller trees are utilized. Maple takes creosote treatment fairly well, being in much the same class as beech and red oak. It does not treat as uniformly as some of the other woods, but absorbs creosote sufficiently well to become fully protected against decay. Like most other woods which do not take full penetration, it is best to bore and adz the ties before treatment.

A NEW idea which promises to give greater economy through saving of creosote, and equal protection has been developed and applied by the Columbia Creosoting Company of Portland, Oregon. It consists of painting the ends of ties, poles and other timbers with a cheap preparation which prevents excessive endwise penetration. It is well known that the tendency of all woods is to absorb the preservative most freely and to the greatest depth in the direction of the grain. Douglas fir and other refractory woods will often show a penetration of a foot or more with the grain and perhaps only half an inch or an inch transversely with it. This endwise penetration is often more and deeper than needed, and out of all proportion to the protection on the other faces. A waste of oil is the result, and it is to prevent this that a coat of paint is first applied to the ends. The oil will go through the paint for a sufficient distance to give the needed protection against decay. Ties for the railroads of India have been treated in this way, and the process deserves investigation in connection with eastern woods.

ANOTHER unique treatment has been developed by this same company. It aims to secure more uniform penetration across the grain by punching a series of small holes to the depth desired. A machine

has been designed which punches ties at the rate of 75 linear feet a minute, the holes being one inch apart across the grain and in staggered rows 8 inches apart with the grain. The depth of the holes is about one inch, and one-eighth inch in diameter. The strength is not reduced since the fibers are pressed apart and not cut; yet the oil is given a chance to distribute itself uniformly from the holes to an extent which would be impossible without them. The same process can be applied to poles, making the treatment deeper at the ground line where most needed.

A NUMBER of well-known wood preserving experts, including Geo. E. Rex, Dr. Herman von Schuenck, O. M. P. Goss, Goeffry Winslow and F. D. Beal, will meet at the St. Helens Creosoting Company plant at St. Helens, Ore., the first week of November. A very important series of tests are to be conducted, as final demonstration of a more economical and effective method of creosoting Douglas fir which has been developed.

The wood paving block campaign continues to be waged with marked success by the lumber associations, both independently and in cooperation with the creosoting interests. During the current year contracts have been awarded for yellow pine creosoted blocks in the south amounting to over 300,000 yards. In the Chicago territory fully 1,000,000, and in the east upwards of 750,000 square yards have been brought out. On the Pacific Coast the paving interests competing with wood block have long monopolized the field. A better understanding, however, is now developing, and the people are learning that well treated and properly laid Douglas fir blocks will give the best possible street paving or factory flooring.

THE railroads continue to use and develop the wood preserving knowledge and practice. The committee on wood preservation of the American Railway Engineering Association is to hold a meeting the early part of November to discuss the further elaboration and standardization of treating practice and preservative specifications.

Ornamental and Shade Trees

A Department for the Advice and Instruction of Members of the American Forestry Association

EDITED BY J. J. LEVISON, B.A., M.F.

Arboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School

COMMON SENSE LABELS ON PARK TREES

THE ignorance of many people regarding the trees in their own back yard has long been a subject of regret to the favored few well versed in arboriculture. While it is well known that this ignorance may be overcome by a visit to botanical gardens or preserves, where experts are expected to have information on such subjects posted at conspicuous places, it has not always been the custom to make public parks do duty as a school of instruction.

Popular interest in trees, however, has of late greatly increased and park officials have in consequence begun to take notice of various means of meeting this interest.

A knowledge of the common tree species of the locality was recognized to be one of the fundamentals to begin with. That knowledge had to be given in the easiest and simplest way because many citizens find it too much trouble to go to a botanical garden to find out. If they could be enlightened unconsciously, as it were, when they go to or from their day's work, they would have no objection. On the contrary, they would be inclined to welcome any acquirement of knowledge that did not entail loss of time and money at an era when the high cost of living makes the quest of dollars rank higher than that of knowledge, of youth and of happiness.

Years ago requests began to come to the Brooklyn Park Department's office regarding the labeling of trees in the public parks. We then endeavored to comply with the evident public demand for instruction of the "he who runs may read" variety. At that time the department manufactured some labels by stamping lead plates and attached them to park trees with generous impartiality in an attempt to cover all extra species as well as native ones with useful as well as ornamental information. In many parks this system of labeling the extra species burdened the busy public with too many names and details, requiring for the average pedestrian the use of a pocket dictionary and not assisting him one whit in the knowledge of that one particular tree which adorned his own back yard.

We therefore had to devise a new label which would not immediately become lost, strayed or stolen because of their lead valuation, and a quantity of real, practical knowledge posted in the parks for general dissemination. The system which has now been adopted by the department differs from that of the botanical gardens, in that it confines itself to 100 of the most common trees—the 100 which everyone ought to know.

This label is a simple, enameled label, brief in context, thoroughly legible and without the special information usually put on labels informing the beholder of the tree's family, locality and other details.

The nomenclature used is the latest and dates on best authorities. Only the common and botanical names of the tree appear upon the labels.

FLOWERING DOGWOOD
CORNUS FLORIDA

Following our custom of dwelling upon the special characteristics by which almost every tree may be recognized at all seasons of the year, rather than by less permanent features, the trees were labeled in winter time and identification based upon these permanent characteristics and not upon leaves.

Park authorities always find that the public takes a real interest in the matter. The people readily respond to their efforts to give information in this manner and there is seldom a time when a stroll through such labeled parks will not result in seeing quite a number of people pause, read the labels and then look closely at the characteristics of the tree. It is a very good thing, for the simple reason that knowledge and recognition of trees by their detail characteristics and the ability to tell them apart stimulates a broader interest in nature and everything that is beautiful. An interest of this sort in the young may prove the root of higher civic pride and may lead to greater civic development.

Our common trees are so constantly about us that knowledge of a few inevitably broadens out to a more extensive knowledge of many so that soon, instead of looking upon trees as meaningless objects, they become individuals, each with a definite character of its own, and much pleasure is derived without the expenditure of extra time for these observations.

TO THOSE who are accustomed to distinguishing trees by their permanent characters, it is just as easy to tell trees apart in winter as in summer. There is the hackberry, for instance. It can be told from others by the peculiar warts upon its bark. The various maples are recognized by their buds—the Norway maple with its large, reddish-brown bud; the sycamore maple having a bud the same size and form as the Norway, but green in color; the sugar maple with its extremely pointed bud; the ash-leaf maple having a green stem; the red maple with a light gray bark like that of the beech, while the silver maple can be readily told by its curved tips; and all the maples can be told from other trees except the horsechestnut and ash by having their branches opposite each other. The horsechestnut and buckeye can easily be told apart and even if you consider some of the less common trees, you can generally find some peculiarity which will stand out above all others. The blue beech has a fluted trunk that gives the impression of well-developed muscles. The pines can easily be distinguished by the number of leaves to each individual cluster—the white pine, five leaves; the pitch pine, three leaves, and the Scotch and Austrian, two, but the former has its needles very short and twisted while the latter are long and coarse. So it is through the whole list, and the various details make a most interesting study for the observant pedestrian at any and all seasons of the year.

Before the new enamel labels were adopted the portable lead labels disappeared almost as rapidly as they were put on the trees, but the enameled ones are guaranteed to stay, as they have no financial value to those who would try to sell them. For very young trees that could not bear the weight of the label, a wire arch stuck into the ground at its base is used to bear the label. The larger trees wear their labels directly on their trunk. Among the evergreens that we labeled are the pines, larches, spruces, hemlocks and cypress, while the broadleaf class includes many varieties of the maple, oak, buckeye, ash, beech, birch, willow, sycamore, poplar, linden, elm, magnolia, hickory, cherry, mulberry, locust, walnut, butternut, Kentucky coffee tree, sassafras, gum, tulip tree, Osage orange and dogwood.

Many parks all over the country are now labeling their trees and every park department is having its own system of labeling as well as its own form of label. Some of these labels are unique and very original. Some are costly and some very reasonable. Our enamel labels in Brooklyn cost fourteen cents apiece. AMERICAN FORESTRY would be glad to hear from its readers and park superintendents on this subject and learn what others are doing in this important form of education.

ADVICE FOR NOVEMBER

CUT around the base of the trees to be moved this winter and fill trench with straw or leaf mold. This will enable the removal of the tree with a frozen ball.

2. Prune and spray same as last month.
3. Collect all fallen leaves from the lawns and, instead of burning them, heap them in a pile, mix in some manure

and turn the compost over three or four times a year. This will form an excellent mulch for your trees and shrubbery beds.

4. In specially exposed places, protect rhododendrons and other tender evergreen specimen plants with evergreen boughs. Do not resort to this unnecessarily.

TAKING THE CROOK OUT OF A TREE

EDITOR AMERICAN FORESTRY: "Being engaged in forestry work, I was recently asked my opinion of a method of getting the crook out of a young and growing tree. The tree in question was purchased for an oriental plane and has been planted in front of a property as a shade tree. The tree has a crook in the stem about six feet from the ground in the shape of a modified S, that is, the crook does not, of course, make such sharp curves; however, they can be plainly seen and the owner was advised by a nurseryman's agent to slit the bark for about six inches lengthwise of the stem and on the outside of the curves and on both of the curves; this proceeding, it was stated, would cause the stem to straighten out in a few seasons. As above mentioned, I was asked my opinion of this treatment and my advice was and I had never heard of employing any such method to straighten a tree. Further, that I personally did not approve of wounding the bark of a tree for any such purpose or, for that matter, for *any* purpose, as to do so would only be inviting fungus attack and diseases of other kinds which might eventually kill the tree. However, I put it up to the owner of the tree to decide what he should do and told him that while I had never heard of using such a method, that did not say that such a method would not be effective; I could not make any statement as to its efficacy as I was not in a position to say one way or another, but I did advise him, should he decide to try any such treatment, to be sure and sterilize any wound he might make on the tree by giving same a coat of good paint, coal tar, or some one of the other recognized agents for this purpose.

"I would be pleased to have your opinion on this subject, through the Shade and Ornamental Tree department of AMERICAN FORESTRY, as I may have a similar proposition put to me at some future time, and should the owner of the tree above mentioned follow either course of advice he has had, especially the former, which I do not approve of, I am situated so that I could watch developments and perhaps learn something of value along this line, and I also believe that any information you may be able to give on this subject through the magazine would prove interesting to a number of other readers.

H. D. LIPPINCOTT."

THE REMEDY

THOMAS B. MEEHAN, an expert nurseryman, was asked by AMERICAN FORESTRY to answer Mr. Lippincott's question and he did so as follows:

"If you slit the bark of a tree, the new growth will bulge out along the line of the slit, healing the wound in one season, but this new growth extends out *beyond* the normal growth of the tree. Supposing then you

have a curve in the trunk of a tree somewhat like a modified S, as stated by Mr. Lippincott,—you would make two or more slits in the bark—about one-half inch apart lengthwise of the trunk,—the number of the slits depending upon the calliper of the tree, and on the *inside* of the curve,—not the outside as stated by Mr. Lippincott, the idea being to fill up with new growth the hollows in the curve of the tree.

"If you were to slit the bark on the *outside* of the curve the additional growth would accentuate the curve in the trunk and it would be worse than it is now.

"While this will produce the desired effect in apparently straightening the trunk, I would not advise it.

"It is true that in time you would apparently straighten the trunk,—it would have to be done year after year for several years,—but would likewise get a very gnarled and knotty appearance which would probably be as objectionable as the curves now existing. You have no doubt seen trees grafted two or more feet above the ground, where the scion has grown faster than the stock—that is just the appearance this tree would have.

"My advice would be to leave it alone. In time as the regular year's growth of the tree is made and the trunk thickens these curves will gradually fill out under the natural conditions of growth, or at any rate will not be as conspicuous as they are while the tree is small.

"If the bark of the tree is slit in the manner described—it is not necessary to sterilize or paint the wound—new bark will commence to grow immediately and fill the wound.

"I have seen old apple and pear trees,—hide-bound old stock,—which have had the bark slit from top to bottom, on all sides of the trees, and there is no question in my mind but what in such cases it is beneficial.

THOMAS B. MEEHAN."

QUESTIONS AND ANSWERS

Q. Would you kindly send me your special instructions for "heading off."

L. W., New York City.

A. "Heading in" is a term used to designate the process of cutting off large portions of branches, more or less uniformly, on all parts of the crown. The crown is thus very much stunted and lessened in size. The shock to the tree is a severe one and should therefore only be used in case of dying trees and trees that are going back rapidly. Some species will not stand this sort of treatment. Species like the sugar maple will not stand severe cutting at all, while trees like the silver maple, sycamore, linden and elm will respond very nicely to the treatment. Species like poplar and willow will be improved by heading them in every few years no matter whether they are in good growing condition or not. In cutting off the large branches from trees on the lawn or in the neighborhood of valuable shrubbery, great care must be taken to lower the branches to the ground by means of rope in order not to injure the plants below. The cuts must be made on a slant, the wounds covered with coal tar and wher-

ever possible a large number of suckers must be left on the remaining branch.

Q. We are developing a piece of property at Summit, N. J., lying on the end of the Second Watchung Mountain. Am about to begin planting shade trees on the streets already constructed and would like your advice as to the best tree or trees to choose. I wish a tree that is hardy, that will grow more rapidly than the average and make a good showing quickly, and one that will not require a good deal of attention after once planted. Oaks, beeches and maples are found very largely in the natural woods of the locality. I have also given some thought to the pink flowering horse chestnut. Would greatly appreciate your advice in the matter. The soil is red clay on top of trap rock, with a thin top soil over all.

H. B. S., New York City.

A. Plant to Oriental sycamore (*Platanus orientalis*), as the tree par excellence for your purpose. It grows rapidly, is absolutely hardy, needs little attention and is quite free from insects and disease. It is well adapted to the location of Summit, N. J., where you desire to plant. The pink flowering horse chestnut, while a very beautiful tree, does not compare with the Oriental sycamore in any of the above qualities. If you would like to purchase a very valuable book on street and shade tree planting, I can recommend most highly "Studies of Trees" by J. J. Levison, the price of which is \$1.75.

Q. I have tried to find some illustrated catalogue of tools needed and used in tree surgery, as I wish to buy a few to use on my place, but cannot find them, nor do I see them advertised in the AMERICAN FORESTRY Magazine. Shall greatly appreciate information with the address of some manufacturer from whom I might procure the necessary tools.

G. J. B., Flat Rock, N. C.

A. Practically all the tools necessary in tree surgery can usually be obtained from almost any well-equipped hardware store. The only precautions regarding the gouges (beyond good steel) are that the sharpening bevel be on the outside or convex side of the curved cutting edge, and that the handles be of the type which drive into a socket. If longer handles are desired, they may have to be made to order on a turning lathe or by hand, as I do not know of any one who keeps them regularly in stock. The chisel is nothing more or less than a gouge with a straight cutting edge. As a matter of fact it is rarely necessary to use one as the best saw for this work is one with the so-called clearing teeth, that is every second or third tooth is a deep one which serves to clear out the sawdust. In green wood of course the teeth have to be strongly set so as to make a comparatively wide cut, at least twice the thickness of the saw blade itself.

Q. Pictures of the European Linden, the Sweet Gum, the Dogwood and the American Beech in the last issue of





AMERICAN FORESTRY have attracted my attention and therefore I desire to ask where I can obtain some of the seeds or transplants of the varieties and whether or not you would recommend them for such an arid locality as Western Nevada.

A. J. P., Carson, Nev.

A. Would suggest your writing to any of the forestry, seed or nursery companies advertising in this magazine for seeds or transplants. As to the availability of the species you mention for such an arid locality as western Nevada, I would not encourage the consideration of the Sweet gum or the American beech, though you might be successful with the European linden, which does well in North and South Dakota where the rainfall is meager. If the ground is irrigated this, of course, would have a decided bearing on your planting, but the safest thing is to stick to the cotton-wood, the hackberry or box-elder, and the linden, as they will give you the best results. The flowering Dogwood, while very beautiful, really needs protection and considerable moisture and I would have grave doubts of any success with it in Nevada except in most unusual surroundings.

DISCUSSION INVITED

The Editor invites and would appreciate discussion, through these columns, of the following questions, raised by Mr. R. Brooke Maxwell, City Forester, Baltimore:

"It would be interesting to have members of our academy and readers of your department of AMERICAN FORESTRY to discuss two tree troubles which I have in mind. The first is a trouble common with our lindens, including the European (*Tilia microphylla*) and its varieties, *Dasystyla euchlora* and *Argentea*, and the American linden (*Tilia Americana*). The trouble is with the leaves and for several years I have noticed that about the 1st to the 15th of August these trees, a large majority of them, lose their foliage and put on a second crop of leaves. The trouble occurs not only on the footways, but also in our parks where the conditions of growth are ideal. I am inclined to think you are going to call the trouble a physiological one due to excessive evaporation and too little water, but this can hardly be the case this year for we have had a season of unusually heavy rains and the condition remains unchanged. Would you call it the linden leaf spot (*Gleosporium tiliae*)? The infection seems to be of too general a nature and too disastrous in its results to call it this.

"The second trouble is with the leaves of sugar maple. This is the same old trouble that tree men have been

calling 'physiological,' caused by too little moisture and excessive evaporation. The trouble occurs on both footways and in our parks. If it is due to unbalanced moisture conditions why should a single tree in a large plantation be affected and the others remain untouched? I have heard it called by some a sugar maple blight. Accurately speaking, I do not believe there is any such disease. Might it not be the leaf spot which is common to the Norway maple (*Gleosporium apocryptum*)?"

ARBORISTS WILL MEET IN NEWARK IN JANUARY

THE first annual meeting of the American Academy of Arborists, formed about a year ago with the aim of advancing arboriculture and landscape forestry and maintaining the highest professional standard among its members, will be held in Newark on January 8 next, in appreciation of the work done by the Newark Shade Tree Commission for the progress of arboriculture.

The sessions will open at 10 a. m. with a business meeting. Addresses will be given as follows at the afternoon session, which will open at 2 o'clock: "The Ministry of Trees," Carl Bannwart, secretary Newark Shade Tree Commission; "The Tree Faker," Hermann Merkel, chief forester New York Zoological Park and president of Academy of Arborists; "Fungus Problems of Interest to Arborists," R. B. Maxwell, city engineer and second vice-president of Academy of Arboriculture; "Arboriculture as a Profession," J. J. Levison, arboriculturist of Brooklyn Park Department and secretary of Academy of Arboriculture. New and important problems in arboriculture then will be discussed by the members. In the afternoon the session will be open to the public. About 1905, some foresters began to specialize in the care of street and ornamental trees. Since that time many cities and towns have taken the matter up and are now employing men to look after the trees on their streets, parks and public grounds. Most of these men work under the name of city foresters, foresters and arboriculturists. Some of them are trained foresters who have made a special study of shade and ornamental trees grown under city and town conditions. Some are not foresters at all but are landscape men who also have made a specialty of shade trees and park development. Others are self-educated men who are in the work because they have a natural liking for it. All these men are valuable assets to the profession.

Through the work of a few pioneers the general public is becoming interested in the work, and a great demand has been made for skilled service in caring for private estates.

Forestry at the Exposition

AMERICAN FORESTRY ASSOCIATION DAY October 20, at the Panama-Pacific Exposition, attracted there a large number of foresters, lumbermen and other members and was made the occasion for the presentation to the Association of a handsome

bronze medal by the officials of the Exposition. This was received by the president, Dr. Henry Sturgis Drinker, other officers present being vice-presidents Everitt G. Griggs of Tacoma, Wash.; Hon. George Pardee, of San Francisco, and Joseph N. Teal, of Portland, Ore.; and

Directors E. T. Allen of Portland, Ore.; Charles F. Quincy of New York City; E. A. Sterling of Chicago; Capt. J. B. White, of Kansas City, and Executive Secretary Percival S. Ridsdale, of Washington, D. C.

President Drinker, upon accepting the medal made an address describing the work of the Association and its importance to the west as well as the east.

The day opened with a meeting, in the Lumberman's Building, in cooperation with the Western Forestry and Conservation Association, Dr. Drinker presiding. His address, on the relations between eastern and western forestry organizations as the east would like to see them, will be found on page 1054 of this issue.

F. C. Knapp, vice-president of the Western Forestry and Conservation Association responded, telling of the relations as the west would like to see them, and Percival S. Ridsdale, Editor of AMERICAN FORESTRY, described what the magazine is doing to help the forest conservation movement in the United States and Canada and how it is furthering public education in forestry throughout the world.

Owing to the west's successful work in forest protection there was much interest in a paper, written by W. R. Brown, president of the New Hampshire Timberland Owners Association, and read by E. A. Sterling, on the organization of eastern timberland owners for forest fire protection and what they have been able to accomplish. A paper by Chief Forester Henry S. Graves, told about the activities of the Government in relation to the lumber industry and the value of the investigative work which it is doing, a work which is proving of great practical aid to the lumbermen.

There were also, during the day, addresses on various

phases of forest industry by H. D. Langille of J. D. Lacey and Company; E. A. Selfridge, president of the California Protective Association, and E. B. Hazen of the West Coast Lumber Manufacturers' Association, each followed by discussions.

On Monday, October 18, the Society of American Foresters held a morning and afternoon session at which there were several addresses and discussions on the work of the professional forester and the relations of forestry and lumbering and between the sessions there were visits to the forestry exhibits of the Argentine Republic, Japan, and the Philippine Islands. A banquet in the evening was the concluding feature of a successful day.

Tuesday, October 19, was devoted by the Western Forestry and Conservation Association to addresses and discussions on forest fire protection work, including Secretary E. T. Allen's report on the year's work of the Association. There were included reports of the Government's work in fire protection in the three western Forest Service districts, and also in British Columbia, together with papers on fire weather forecasts and their effectiveness; the relation of modern inventions to forest protective work with a discussion of the probable future use of aerial telegraphy or telephony, heliograph, aeroplanes, observation devices and new forms of extinguishing apparatus. One particularly interesting feature was E. T. Allen's address on creating public sentiment as an aid to securing necessary precautions in preventing forest fires.

The Pacific Logging Congress held its sessions on October 21 and the same evening many of those attending the various meetings left on a special train and spent two days among the redwood camps in the northern part of the State.

The Situation in Michigan

BY H. H. CHAPMAN

THE report of the Public Domain Commission of Michigan for the year ending June 30, 1914, just issued, gives a very complete account of the work accomplished during the five years since the Commission was organized. The Commission is responsible for the management of State lands totaling in June, 1914, 592,416 acres; including forest reserves, 235,245 acres, and lands not so classified. A second department of work is that of supervising and stimulating immigration, for which purpose an agent is maintained in New York City. Still a third department, over which the Commission formerly exercised partial control, has now (July, 1915) been placed entirely under their jurisdiction, namely, the combined work of fish and game, and of forest fire protection.

The report is full of interest, showing as it does the rapidly increasing importance of the work in forestry on State lands. Thanks to the vigorous agitation conducted for years in the State, both before and after the creation of the Commission, the policy of withdrawing worthless lands from sale and devoting them to forest production is now firmly entrenched. This has been

especially beneficial in dealing with many speculative town sites platted, sold and abandoned for taxes, which have now been permanently withdrawn.

At one of the first meetings after its organization, the Commission set aside lands for forest reserves which, together with those previously reserved, brought the total to 235,245 acres. A policy of sale and disposal was pursued for the three years succeeding, during which time some 347,060 acres passed out of State ownership.

In the fall of 1912, Mr. A. C. Carton was elected as Commissioner of the State Land Office on a platform to abolish the office, dispensing with the selling of State lands, and the turning over of all lands to the Public Domain Commission. In January, 1913, he placed a minimum price of \$6.00 per acre upon all State lands, and withdrew them from sale and entry. At the next meeting of the Public Domain Commission they confirmed this action, and directed that no State lands be offered for sale in the future and that only such lands as were required for school house sites, cemetery purposes, railroad rights of way, or similar public purposes be disposed of. The Legislature then passed an act to

abolish the office and turn all lands in the State over to the Public Domain Commission, and the Land Office is now a thing of the past. All State lands are now under the control of the Public Domain Commission, with the exception of lands granted by the United States Government for specific purposes, such as the primary school, agricultural college and university lands; and all lands under the control of the Commission will eventually be used for forestry purposes.

At the request of the Public Domain Commission, the Legislature also passed an act allowing the State to exchange lands with the United States Government, corporations and private individuals, for the purpose of consolidating its forest reserves. Later, Congress authorized the exchange of United States Government lands with the States so that it could procure the lands within the boundaries of its reserves. Under this act 50,000 acres have been examined for exchange with the United States Government and private individuals, and the exchange of about 1,600 acres has been made with private individuals.

The Commission also has the right to buy lands for forest reserves.

The purpose of these measures is to consolidate the present reserves by the elimination of private holdings of non-agricultural lands. There are fifty-two State forests in Michigan at present, the two largest of which each contain about sixty square miles or 38,000 acres of land. The majority are at present small in size and composed of somewhat scattered holdings, which must in the future be brought together.

This need of consolidation has been emphasized by the improvement work actively undertaken upon five of the forest reserve areas. Forest planting to restore the forest is a necessity on most of the Michigan reserves. Repeated fires following logging have left no second growth of value over wide areas. Planting demands fire protection consisting of fire lines, watch towers and telephones, with the accompanying force of lookouts and rangers, without whom no amount of physical preparation would avail. Planting also requires much labor, supervision, teams and equipment, including nurseries. This calls for houses, barns, barracks and waterworks. Such a plant must serve a large area to be economical and efficient.

Michigan has had such a plant on the Higgins Lake Forest Reserve, of 13,580 acres, for several years, and has also installed headquarters houses, barns, lookout towers, fire lines, telephones upon the Houghton Lake, Fife Lake, Lake Superior and Ogenaw State Forests, whose areas are, respectively, 38,578, 7,102, 38,007 and 4,199 acres, bringing a total of 101,468 acres under administration. Two more forests will be put under management during 1915, but, although the Commissioners intend to extend the work of bringing the remaining forests under management, they will find it increasingly expensive as the areas administered become smaller and more scattered.

The work of forest planting and fire line construction initiated and brought through its experimental stages by the old Forestry Commission at Higgins Lake has been

greatly expanded and as more funds became available initiated on other reserves. A standard fire line is in use, following the section lines, as the country is so flat as to preclude any advantage of ridge lines. These fire lines are first cleared 16 feet wide, then grubbed of stumps and roots for 12 feet, then a 10-foot strip is plowed. This strip is cultivated twice a year to preserve a dirt surface and destroy grass or other growth. Two hundred and seven miles of line have been built, at a cost per mile varying from \$47.09 to \$81.94, although by utilizing old logging railroad grades the cost per mile was but \$8.63. The lines serve as vantage points for backfiring, and may even stop a small fire automatically, but can never be depended upon to do it without the active work of fire patrols. From these lookout towers, in which lookouts are kept during the dry and dangerous seasons, there radiates 20.5 miles of telephone lines, connecting headquarters and the nursery. These lines are used only for forest protection purposes. On one reserve is a specially equipped automobile that takes the first crew to the fire when it is discovered. Later on they are followed by the teams and equipment necessary to extinguish the fire if it is too large a one to be handled by the first crew.

The plantations are further protected by fire lines around each forty acres. These plantations now cover 1,409 acres, and will be extended far more rapidly in the future. Norway pine constitute 52 per cent of the area, and white pine 38 per cent. Since the Norway pine is practically free from dangerous insect and fungus enemies and has a large measure of fire resistance after attaining merchantable size, the preference shown for this species is commendable. It also outgrows white pine on sandy soil. It may be questioned whether this policy of close planting, up to 2,300 plants per acre, is sound practice. The advantages of early securing a forest cover and thus reducing the grass and inflammable herbage must be offset against the certainty that such close stands will soon become too crowded, and serious loss from stagnation result before they reach a size permitting the removal of profitable thinnings. Over 1,000,000 seedlings have been sold and distributed throughout the State. Dead and down timber to the value of \$3,363 has been sold.

The appropriations for the work of the Commission have gradually increased from \$9,700 to \$105,000 per year.

To sum up, Michigan ranks third in area of State reserves, third in number of acres planted, fourth in area of State forests, and fifth in size of State appropriations for forestry. Mr. Carton states that the number of acres set aside for forestry purposes should in reality be listed as 600,000, as all of the lands belonging to the State which are under the jurisdiction of the Public Domain Commission are practically subject to exchange, and are in fact lands that will be used directly for forestry purposes or exchanged for other lands to be so used. When this process is completed, Michigan will rank third in acreage of State forests.

Many of these forests will be used for the propagation

of game. Elk from the Yellowstone Park have already been placed on the big reserve in Roscommon County.

The completion of the work of land classification, exchange and consolidation is the most important work ahead of the Commission, and must precede any great extension of the work of developing the individual forests.

The report contains two sub-reports, one by C. M. Granger and one by J. G. Peters, both of the U. S. Forest Service, offering certain suggestions for the future improvement of the State work. These reports call attention to certain weak points in the present organization. The work of the State Forester, who in other States is entrusted with large educational and administrative duties of state-wide application, has in Michigan been strictly limited to the development of the State Forest Reserves and their protection. Fire protection in the State has been thus divided between the State Forester on State lands, and the State Forest Commissioner, who is also the Game and Fish Commissioner.

The consolidation of the fire protection service under the Commission, secured in 1915, is a step in the right direction, and can be made to work out well provided the Commission clearly recognizes the two fundamental principles of organization upon which efficiency in other States has depended. The first of these is an independent set of fire wardens, who are not saddled with the responsibilities and drawbacks attached to the enforcement of game and fish laws. The temptation to obliterate the distinction between game and fire wardens in order to make a better showing and use each State warden more effectively should not blind the Commission to the fact that the fire problem requires special treatment to be solved at all, and that a proper public attitude is the keynote to the enforcement of the fire laws. The time is not ripe for such "economies," and the effect will surely be to reduce efficiency or nullify the efforts of the State fire wardens.

The second principle is the placing of forest fire protection in the hands of a trained forester or woodsman, whose chief interest lies in the field of forestry, and not of fish and game protection. The most successful form of organization, and that which is found in nearly every State which maintains a forest fire department, is a separate force of State or local fire wardens not connected with fish and game administration, and under the direction of a State forester or fire warden whose time is either entirely devoted to forest fires or whose other interests and energies are exerted along forestry lines rather than those of fish and game protection. Fire protection is essential to forestry, and while it affects fish and game indirectly, it is not the primary consideration in this field. The Conservation Commission of New York, under which these two departments are consolidated, has never made the mistake of destroying the identity of its fire warden force, but has from the first maintained separate wardens for these two distinct fields of operation. Nor has this State entrusted its fire laws to the administration of the game warden, but has always maintained a separate administrative head for the fire protection work, who has for years been a trained forester. This plan is earnestly urged for consideration in Michigan, under the new consolidation of these departments.

[NOTE.—The States which maintain separate administrative heads for forest fire protection and separate organizations of forest fire wardens, not connected with fish and game administration, are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, New Jersey, Maryland, North Carolina, Virginia, Kentucky, Tennessee, Texas, Wisconsin, Minnesota, Montana, Idaho, Washington, Oregon and California.

The remaining States, with three exceptions, are largely agricultural or have not established State organizations for fire protection.]

Editorial

STATE FORESTRY ASSOCIATIONS

STATE forestry in this country, after twenty years of development, is yet in its struggling infancy. In some few states, commendable progress has been made in developing state organizations for fire protection, and in educating the public to a new and sane attitude towards forest fires. In a still smaller number of states the question of state forest reservations has been aggressively agitated, with far-reaching results. But taken as a whole, the forestry movement in the individual states is struggling with tremendous obstacles, due to many causes. A clearly defined state policy for administration of lands worthless for agriculture and their restoration to productiveness through forestry confronts the inherited weaknesses of our individualistic form of government.

Indifference to public or commercial welfare, the gauging of results solely by immediate private profits, the horrible inefficiency of the corrupt partizan or spoils system of public service, which, should it be exposed to such urgent stress as that of England or France in the present war, would either crumble or give place to efficiency, all constitute obstacles which threaten not only to seriously interfere with, but to almost completely prevent, the final establishment of state forestry on a sound permanent basis.

The success of state forestry means nothing short of a complete transformation in the general attitude of entire state communities towards the economic treatment of forest land. Such constructive work requires long-continued, patient and intelligent effort on the part of

men whose knowledge of the aims and purpose of state forestry rest on the secure basis of technical and professional knowledge. State forestry departments must be so constituted that such men are not only secured for the work but are kept in the service of the state on a permanent basis which permits them to give to their work the cumulative knowledge and efficiency of years of experience. If the office of state forester is to become a political plum, technical foresters will be replaced by politicians or by young and inexperienced foresters who, for the sake of a job, are willing to take a chance on being replaced when the administration changes. No results worth considering will ever be accomplished in state forestry under such a system. "By their fruits ye shall know them." The states which today are rapidly progressing in fire protection, in state forest reserves and in other forestry lines, are in practically every instance served by state foresters who have been retained for several years by non-partisan commissions and who expect to continue in those positions as their life work, in the same manner that an efficient employee of a business corporation plans on devoting his ever-growing ability to the work of his employers, without fear of being deposed for arbitrary reasons wholly unconnected with his character or services.

But this condition, through which alone states can secure results, comes into sharp conflict with the spoils system which in many places and by many methods is seeking rehabilitation under cover of a reaction from too much progressivism. One favorite method of demolishing a non-partisan forestry board at present is by a reorganization of forestry, usually by a combination with other conservation interests, notably those of fish and game protection. Such proposed legislation will be found in most instances to provide for the arbitrary political appointment of the state forester instead of permitting

him to be selected by the non-partisan board. Another method is the curtailment of appropriations for non-partisan forest fire warden forces below the point of efficiency. In a state which has failed, through improper organization, to secure efficient forestry administration, the appropriations devoted to forestry are dissipated in salaries and expenses which produce no lasting results and the final outcome must be the failure and abandonment of the propaganda itself.

To secure these vital conditions of success, forestry sentiment must be organized and active. The logical method of expression is through a state forestry association. A few states have such organizations, notably Massachusetts, Pennsylvania, Minnesota, Michigan and, of late, New York. To be successful and to accomplish its purpose, a state forestry association must have an active and well-informed secretary, who can devote a large part of his time to the work of the association. Without such a secretary no association can grow beyond a merely nominal strength. As soon as the association can afford it, the secretary should receive a salary. He should be a capable organizer and business man, as well versed in forestry as possible. Such a secretary will cause the association to grow rapidly.

An association which has developed into a strong, progressive and wide-awake organization, can not only secure needed legislation, but can by the weight of its influence prevent the passage of spoils legislation and can maintain the integrity of the state forest service against the efforts of politicians to dominate and control the personnel and the appropriations. Without such an association public opinion, unorganized and often led astray by false information, will be practically helpless. State forestry rests upon the expressed will of the people, and the state forestry association is the means of expressing this will effectually.

TAXATION AND CONSERVATION

IF CONSERVATION of the forests which they own is practical, then lumbermen will practice conservation. Just how such conservation may be made practical is a decidedly interesting problem and the opinion of lumbermen who have given thought to it is valuable.

One such lumberman is Charles L. Latimer, president of the Northern National Bank of Ashland, Wisconsin, who, in a recent letter to AMERICAN FORESTRY, said:

"I am very much interested in the literature received from time to time from your association and, being a lumberman of some years' standing, have some ideas about the best way to preserve our forests, and in this connection would say I believe we should begin with proper legislation and particularly tax legislation. As the taxes are now, in practically all of the states standing timber pays an annual tribute going higher and higher each year, thus putting timber owners in a very uncomfortable condition—forcing a man to cut his holdings in order to realize something besides taxes for his investment, in so doing, owing to market conditions, he is compelled to leave a large amount of valuable timber, either

to be blown down or burned up. Under proper tax conditions he would only be compelled to cut as fast as the market would warrant, and when he did cut, should he pay a cumulative tax, there would be coming to the timber owner exactly what belongs to him and no more. What timber remained would be for future years or future generations.

"Proceeding a little further with our legislation, in order to cut our timber clean we should legislate so that timber from other countries would not come in competition with our own as it does at this time. My opinion is that there is as much timber wasted in the United States today, owing to free admission of lumber into the United States, as would offset the value of lumber that is imported from Canada and British Columbia. The American people are out just the amount of money we pay the outsider for his lumber.

"It is hardly a practical proposition to reforest, or to perpetuate the forests we now have, until we have legislation that will protect the forests. I believe the true solution would be the cumulative tax, together with a sufficient duty upon imported lumber that would enable us to cut our forests clean as we go along."

Forest Notes

A Conservation Measure

T. R. Helms, a member of the American Forestry Association, writing from New Orleans says:

"Do not try to see how many logs you can cut up, try and get all the lumber you can get out of them.

"Try to make lumber, instead of simply cutting up logs.

"You work for the interests of the company if you save all the lumber you can.

"Lumber is money, do not waste it."

This is quite different from what it was years ago, when the efficiency of the sawyers was judged by the number of feet of log scale they would saw in a shift, and consequently they would cut up the logs the quickest way they could, regardless of how much or what kind of lumber they got.

Prof. Brown Back from 6,000 Mile Trip

Nelson C. Brown, Professor of Forest Utilization in the State College of Forestry at Syracuse, has returned from a 6,000 mile trip through the National Forests of the Rockies and Cascades. Professor Brown left Syracuse in June and went directly to New Mexico where he studied methods of utilizing and protecting timber in the Southern Rockies. He then went up through California, visiting the redwood lumbering north and east of San Francisco to the Puget Sound Country. There he visited some of the largest sawmills in the world and not only studied methods of utilization and manufacture, but looked carefully into the matter of methods used by the western lumberman in supplying the eastern markets. After studying conditions in Idaho and Montana he visited the White Pine section of northeastern Minnesota, where much of the best White Pine is coming from today. Professor Brown brings back to the College a large amount of illustrative material which will be used in instructional work and in the forest museum of the College.

Ten Buffalo Calves

The Government's herd of buffalo on the Wichita National Forest, in Oklahoma, which is also a Federal game preserve, has been increased by the arrival of ten calves, according to a report received by the Forest Service from the supervisor in charge. The herd, which now comprises sixty-two specimens of the almost extinct bison, is in good condition, says the supervisor, and promises to continue increasing at a rapid rate.

Prof. Chaffee on Extended Trip

Prof. R. R. Chaffee, who is in charge of the course in lumbering at Penn State Forest School, is making an extensive trip

through the northwest and along the Pacific coast studying the large logging operations and visiting the National Forests. Prof. Chaffee expects to return in November to take charge of the new optional course in lumbering which has recently been established at Penn State.

Syracuse Registers 274 Men

The State College of Forestry at Syracuse, N. Y., has just closed registration for the college year with 274 men. These men have registered for four and five year professional courses in Forestry and represent 55 counties in the State and 12 States outside of New York. Some of the largest county representations come from Westchester, New York, Erie and Onondaga. The following States are represented. Massachusetts, Vermont, New Hampshire, Connecticut, New Jersey, Pennsylvania, Ohio, Kansas, Virginia, Wisconsin, Minnesota and District of Columbia. Russia and Armenia are represented as foreign countries. Besides the 274 men in the professional courses in the State College of Forestry at Syracuse there are 18 men taking the one-year practical course in the State Ranger School at Wanakena.

What Minnesota Needs

C. C. Andrews, secretary of the Minnesota State Forestry Board writes that: "Forest consumption has been going on in Minnesota seventy years, and there is now need of strong measures for reforestation. There is in this State a great deal of land that is chiefly valuable for the production of timber, some of which is bare, exposed to sun and wind and growing poorer every year. It is true that in places one now sees a fine regrowth of forest, but on an average, in my opinion, after twenty years of particular observation, not more than 5 per cent of it is well restocked (close growing), with valuable kinds of timber trees. It will take nature unaided more than a century to renew our forests; the State must assist. Thoughtful citizens should keep this matter in mind and help educate a public sentiment that will cause another legislature to give reforestation a proper start."

Wirt as Chief Fire Warden

George H. Wirt has been appointed chief forest fire warden of Pennsylvania in accordance with the recent act of the Legislature providing for reorganization of the forest fire warden system. In this reorganization the State forestry department will take advantage of its foresters as they are now located on State Forests and use them as centers of inspection of as many local fire wardens as they can conveniently

handle. In this way it will probably be able to keep in close touch with all of the fire wardens in at least thirty-five counties of the State and those counties which are most wooded. Following that the department shall take steps to organize the system in other counties by cooperation with local organizations of sportsmen and other bodies interested in forest preservation. It will also attempt to institute a complete system of fire towers all over the State and carry on a campaign of education against forest fires. Unfortunately, the department will have to be somewhat limited in the last two propositions during the next two years, owing to the fact that for this period of time the Legislature and Governor have given only \$43,000 for the work.

Mr. Wirt graduated from the Biltmore Forest School in February, 1900. In April of that year he began service with the Pennsylvania Department of Forestry as a State Forester. In 1903 he was placed in charge of the State Forest Academy and had charge of it, together with the Mont Alto State Forest, until May, 1910. At that time he was sent to Harrisburg and placed in charge of the work of inspecting private tracts and assisting private individuals in the handling of their woodlots, together with other miscellaneous technical and office work.

Wisconsin's New Forester

Professor F. B. Moody, for the past two years extension professor in forestry at Cornell, has taken up his new duties as a member of the forest, fish, and game commission of the State of Wisconsin. By this action he becomes not only a member of the commission, but the State Forester, succeeding E. M. Griffith, who recently resigned.

Professor Moody went to Cornell from Wisconsin, where he was a member of the State Forestry staff, and it is stated that his thorough familiarity with Wisconsin conditions led to his choice as a member of the Wisconsin commission. While he is being congratulated on the new opportunity, great regret at his leaving is expressed by his colleagues at the State college of agriculture, where he has been one of the most popular members of the forestry faculty.

He has been closely in touch with the lumbermen, and particularly with the farmers, of the State in his woodlot demonstrations, and has been commended for his sound common sense on forestry problems and his practical familiarity with them.

Professor Moody's successor in the extension work in forestry has not yet been chosen, and probably will not be selected until the members of the Forestry School return from the Adirondacks. The activities of the entire school have been transferred to an Adirondack logging operation, where the Senior Class is now securing practical training in woods work.

Canadian Department

BY ELLWOOD WILSON

Secretary Canadian Society of Forest Engineers

The campaign against those responsible for setting forest fires has been waged vigorously and successfully this season. The Lower Ottawa Forest Protective Association has eight convictions against settlers who carelessly allowed their clearing fires to get away from them, and the St. Maurice Forest Protective Association has had one very important conviction and ten more cases under way. These convictions are having an important effect as they show that the laws are really meant to be enforced and bring home to the careless ones the necessity of taking precautions, in a way which appeals to them. As soon as the Governments of the respective Provinces make it necessary to have permits in order to start fires for clearing, no matter what the time of year, settlers' fires will be a thing of the past.

The Canadian Society of Forest Engineers has just been incorporated under the laws of the Province of Ontario. This Society has had a healthy and steady growth and is increasing in importance and influence. It now numbers forty-eight active, thirty associate, two honorary and two student members. Mr. P. S. Ridsdale, Secretary of the American Forestry Association, has just been elected an Associate Member.

An interesting experiment was undertaken by the Laurentide Company, Ltd., this season. On a good deal of their waste land which is being planted there are old hardwood stumps and a good deal of young hardwood brush. This grows much faster than spruce or pine and on two of the plantations was seriously retarding the growth of the plantations. A couple of small goats were purchased and turned into these plantations but they promptly commenced to eat the planted trees as well as the hardwood. The Company's herd of reindeer was then tried and although they have been grazing on the plantations all summer they have not eaten a single spruce or pine but have cleaned off the poplar, birch, and maple well and the coniferous plants show as good a growth as those in the open. A few plants have been injured where the deer have made roads but the number is so small as to be entirely negligible. The feed has agreed with the deer and they are in wonderful condition. This proposition of natural hardwood regeneration on burnt over and cut over lands was beginning to be a serious one as it is entirely out of the question to cut this, either before or after planting, and it retards the growth of the plants dominated by it to such an extent that it seemed almost hopeless.

The *Canadian Lumberman* for Sept. 15th prints an excellent article on "The Problem of Slash Disposal" by Mr. Clyde Leavitt, Forester to the Conservation Commission. The whole question is thoroughly discussed and definite measures to help the present situation are proposed, all of them practical and practicable.

Mr. R. H. MacMillan, Chief Forester of British Columbia, and acting at present as special trade commissioner, traveling abroad in the interests of his Province, has completed his work in England successfully and is now en route to South Africa.

Work has commenced on the large new storage dam being built by the Quebec Government to control the flow of the St. Maurice River. This dam is forty-four miles from the nearest railroad, the National Transcontinental, and barges and steamers are being provided to carry supplies, cement, etc., to the first rapid, a distance of twenty-eight miles and from that point to the dam site, sixteen miles, a railroad will be built. This dam will be the largest water conservation scheme in the world and will hold back twice the amount of water stored by the enlarged Assouan dam on the Nile. It will be about 2,000 feet long and eighty feet high at the highest point. There are many large lakes above this dam, one being over thirty miles in length, and the level of all of these lakes will be raised. The timber which will be destroyed is for the most part scrubby black spruce, balsam, birch and poplar and little of it has any commercial value. There are no settlements of any kind, only one Hudson Bay Post on Lake Obiduan, the country being inhabited by Indians.

Tenders are also being asked for a dam to be constructed at the outlet of Lake St. Francis, on the St. Francis River, on the south shore of the St. Lawrence, which serves a number of important industries which have been much hampered by low water in the summer time. It may be of interest to American readers to know that in the little Indian village of Pierreville, near the mouth of the St. Francis River, it is said, the grandmother of Senator Matthew S. Quay, of Pennsylvania, was born. She was an Indian woman of the Abenaki tribe and I am told that Senator Quay's picture hangs over the altar in the Indian Church.

The report of the Fire Inspection Department of the Dominion Railway Commission shows that during 1914 a total of 1,346 fires were reported in forested sections within three hundred feet of railroad rights-of-way, on lines under the juris-

diction of the Railway Commission. These do not include Government Railways or lines under Provincial charter, about 15 per cent of the total mileage. A total area of 191,770 acres was burned, valued at \$443,442, of which \$202,987 was merchantable timber. Although the season was one of the worst in years the railway fires show a decrease and the situation is steadily improving. Two suits were entered against railways in the Parry Sound District in Ontario and the Grand Jury in making its present protest against the non-enforcement of the forest fire laws and the negligence of the officers charge with this enforcement.

There is at present a great demand for box shooks for making ammunition boxes. The specifications are very strict and there is difficulty in obtaining material.

His Eminence the Cardinal-Archbishop of Quebec, always a strong supporter of the work of the Canadian Forestry Association, will soon issue a letter to be read in all the Churches of the Province, reminding all faithful Catholics of their duty to protect the forests from fire and to conserve them for posterity. This will be of great assistance in impressing upon all the people the necessity of using greater care with fires and also of observing the forest fire laws.

Mr. George Chahoon, Jr., a Director of the Canadian Forestry Association and Associate Member of the Canadian Society of Forest Engineers, has just been elected President of the Laurentide Co., Ltd., the largest and most progressive paper company in Canada, to succeed the late Sir William Van Horne. Mr. Chahoon, like Sir William, was born in the United States, being a native of Au Sable Forks, in the Adirondacks, where his family has long had paper interests. He is still a young man, being only forty-three. He took charge of the Laurentide Company about twelve years ago and has built it up to its present high standing. His broad general interests and open mindedness early persuaded him that only happy and contented employes give their best work and he has done everything to make Grand Mere, not only livable but also attractive and has succeeded in building up one of the prettiest villages in Canada. Realizing that a cheap and steady supply of raw material was of vital necessity to this Company he became interested in forestry and has done more along practical lines to utilize what this science had to offer than almost any man in Canada, taking not only a selfish interest in it but looking at it from the broadest standpoint and urging the Provincial Government to a more progressive policy. The first large forest survey in Quebec was that made by his Company and it is also the first one to take up commercial planting on a large scale.

AMERICAN FORESTRY

Sr. Don Ricardo Cordoniu, who has been for many years in charge of the work of the Spanish Government in reforesting the sand dunes and control of torrents and tree planting in the mountains, has had conferred on him, on the occasion of his 67th birthday, the Grand Order of Elizabeth the Catholic and Agronomical Merit. The insignia of the order was given him by public subscription. Sr. Condoniu is the editor of *Espana Forestal*, one of the heads of the only forestry school in Spain and a member of the society of Amigos del Arbol.

The last number of *Espana Forestal* has just been received and is a very creditable piece of work, the illustrations are excellent and there is more attention paid to the aesthetic and artistic side of forestry than in any other forestry journal published.

Secretary Robson Black, of the Canadian Forestry Association, has just made a trip to the territory patrolled by the Lower Ottawa Forest Protective Association and to the Ontario Government Nurseries and plantation, at St. Williams, Ont. Fifteen acres are covered by the nursery and about eighteen hundred acres have been taken over from farmers and planted up. Mr. E. J. Zavitz, Provincial Forester, deserves great credit for the efficient way in which he has handled this work and for the excellent condition of the nursery and the good he has done in awakening public interest and in turning a barren section into a fine prospective forest. The pine plantations have now reached a height of nine and ten feet and are in excellent condition. Enormous numbers of hardwoods of all sorts are grown for distribution.

Mr. Black also investigated the "fake settlers" in the Township of Boyer, Province of Quebec, and showed the disastrous result of their being allowed to take up land simply for the purpose of cutting off the timber. This is an abuse which has been a crying shame but which the Province is rapidly controlling, and soon hopes to make a thing of the past.

British Columbia Notes

Under the direction of the Hon. the Minister of Lands, an attractive pamphlet entitled "British Columbia Timber" has been prepared for distribution among the buyers in overseas markets. It is intended to draw the attention of importers overseas to the forest products of the province, and especially to the facilities for exporting British Columbia lumber. Consisting of nearly forty pages, and containing thirty illustrations, the pamphlet treats of the principal exportable woods, their qualities and uses, together with information concerning their strength, values and suitability for various uses. Also a pamphlet entitled "How to Finish British Columbia Wood," giving full details and directions for hand-

ling and finishing woods and the different kinds of paints, stains and varnishes which are suitable for getting the effects desired.

At a recent meeting of the British Columbia Forest Club a very interesting paper on the Forests of Central British Columbia was read by Mr. H. R. Christie, and one on general administrative problems in forestry work by Mr. W. N. Millar.

The Hon. the Minister of Lands, is in receipt of advices from the Tete Jaune Cache district, reporting that during the month of August there were seven hundred thousand feet, board measure scaled, being timber cut by the Canadian Northern Pacific Railway during its construction through the timber limits in the North Thompson Valley, and representing the addition of \$2,600 to the provincial revenue in stumpage and royalties.

While its lumber industry is quiet, it is believed that much development will take place in that district as soon as economic conditions permit.

Fifty-five fires have been reported this season, some sixty acres in all having burned over, with damage to rather less than three hundred thousand feet of standing timber. Ten of these outbreaks, affecting twenty acres and damaging about two-thirds of the timber mentioned, were due to lightning. Hot, dry, windy weather for the past few months rendered the position one of great hazard, and it is a tribute to the efficiency of the fire-wardens that the losses and fire fighting expenditures have been kept within comparatively small limits. The splendid spirit of co-operation existing throughout this large district has been a valuable asset, several instances having occurred of settlers walking or riding many miles in order to report the outbreak of a fire.

Land-clearing by settlers has been extensively undertaken this year, and good crops are reported generally, especially in view of the fact that many areas are virgin ground, and have been broken up for the first time this year.

Current Literature

MONTHLY LIST FOR OCTOBER, 1915.

(Books and periodicals indexed in the library of the United States Forest Service.)

FORESTRY AS A WHOLE

Proceedings and reports of associations, forest officers, etc.

India—Andaman Islands—Forest dept. Progress report of forest administration for the year 1913-14. 41 p. Calcutta, 1915.

India—Bombay presidency—Forest dept. Administration report of the forest

circles, for the year 1913-1914. 184 p. Bombay, 1915.

New Jersey—orest park reservation commission. Tenth annual report for the year ending October 31, 1914. 79 p. pl., map. Trenton, N. J., 1915.

Forest Education

Cornell university—Dept. of forestry. Courses in forestry; a circular of information for prospective forestry students. 11 p. il. Ithaca, N. Y., 1915.

Montana, University of—Forest school. Second annual announcement, 1915-16. 63 p. il. Missoula, Mont., 1915.

Forest Botany

Lawler, James. Twenty Canadian trees. 23 p. il. Ottawa, Canadian forestry association, 1915.

Silvical Studies of Species

Mattoon, Wilbur R. The southern cypress. 74 p. il., pl. Wash., D. C., 1915. (U. S.—Dept. of agriculture Bulletin 272.)

Silviculture*Planting and nursery practice*

New Zealand—Dept. of lands and survey. Report on state nurseries and plantations for the year 1914-15. 69 p. il., pl. Wellington, 1915.

Forest Protection*Diseases*

Ross, R. M. The chestnut bark disease in Vermont. 16 p. pl. St. Albans, Vt., 1915. (Vermont—Forest service. Forestry publication no. 16.)

Fire

Kentucky—State forester. Manual of instructions for county forest wardens and district forest wardens, and information in regard to the prevention and suppression of forest fires. 31 p. Frankfort, Ky., 1915.

New Hampshire—Forestry commission. Personnel of the forest fire service. 53 p. Manchester, N. H., 1915. (Circular 8.)

United States—Dept. of agriculture—Forest service. Fire protection in District 1, for the use of forest officers. 117 p. Wash., D. C., 1915.

Forest Legislation

New Hampshire—Laws, statutes, etc. Forest laws. 31 p. Concord, N. H., 1915. (New Hampshire—Forestry commission. Circular 7.)

New Jersey—Laws, statutes, etc. The law and regulations concerning camp fires in New Jersey. 4 p. il. Trenton, N. J., Dept. of conservation and development, 1915.

New Jersey—Laws, statutes, etc. Laws of New Jersey relating to forestry, 1915. 44 p. Union Hill, N. J., 1915.

United States—Dept. of agriculture—Forest service. State forestry laws; Louisiana, through regular session, 1914. 7 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest

CURRENT LITERATURE

service. State forestry laws; Maryland, through regular session, 1914. 6 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. State forestry laws; Missouri, through regular session, 1915. 2 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. State forestry laws; North Carolina, through regular session, 1915. 5 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. State forestry laws; Texas, through regular session, 1915. 3 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. State forestry laws; Virginia, through regular session, 1914. 6 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. Forestry laws of Wisconsin, through regular session, 1915. 16 p. Wash., D. C., 1915.

United States—Dept. of agriculture—Forest service. State forestry laws; Wyoming, through regular session, 1915. 3 p. Wash., D. C., 1915.

Forest Utilization*Lumber industry*

Barns, W. E. Business and lumber trade conditions, Nos. 42, 43. St. Louis, Mo. St. Louis lumberman, 1915.

National lumber manufacturers' association. The modern lumberman; reports and addresses presented at the 13th annual meeting, in San Francisco, Cal., May 12-13, 1915. 196 p. Chicago, Ill., 1915.

Wood Technology

Betts, Harold Scofield and Newlin, J. A. Strength tests of structural timbers treated by commercial wood-preserving processes. 15 p. il. Wash., D. C., 1915. (U. S.—Dept. of agriculture. Bulletin 286.)

British Columbia—Department of lands—Forest branch. British Columbia red cedar shingles. 12 p. il. Victoria, B. C., 1915.

British Columbia—Dept. of lands—Forest branch. British Columbia timber and other forest products for export. 40 p. il. Victoria, B. C., 1915.

British Columbia—Dept. of lands—Forest branch. How to finish British Columbia wood. 16 p. il. Victoria, B. C., 1915.

National fire protection association. Report of the committee on uses of wood in building construction. 55 p. il. Boston, Mass., 1915.

Wood Preservation

MacDonald, G. B. Preservative treatment of fence posts. 70 p. Ames, Ia., 1915. (Iowa—Agricultural experiment station. Bulletin 158.)

Auxiliary Subjects*Description and travel*

Darton, Nelson Horatio and others. Guidebook of the United States, pt. C: The

Santa Fe route, with a side trip to the Grand Canyon of the Colorado. 194 p. il., pl., maps. Wash., D. C., 1915. (U. S.—Geological survey. Bulletin 613.)

Botany

United States—Dept. of agriculture—Forest service. Notes in national forest range plants, pt. 1: Grasses. 224 p. Wash., D. C., 1914.

Irrigation

International irrigation congress. Official proceedings of the 21st International irrigation congress, held at Calgary, Alberta, Canada, Oct. 5-9, 1914. 402 p. il. Ottawa, 1915.

Engineering

Los Angeles county, California—Board of engineers, flood control. Provisional report, submitted to the Board of supervisors, Los Angeles county, June 3, 1914. 24 p. il. Los Angeles, 1914.

Periodical Articles*Miscellaneous periodicals*

Agricultural gazette of Tasmania, July, 1915. —The stave silo, by F. H. Johnstone, p. 259-62.

Annals of botany, July, 1915.—"Brown oak" and its origin, by Percy Groom, p. 393-408.

Capital, Sept., 1915.—Giant trees of Sequoia, p. 13, 14.

Country gentleman, Sept. 25, 1915.—Stopping runaway waters; Mangum terraces keep farms on hillsides, even when it rains, by J. Russell Smith, p. 1485-6; That hedge fence; an asset that has become a liability, by Herbert R. Cox, p. 1493.

Far Eastern review, Aug., 1915.—Philippine woods for the China and foreign markets, by W. F. Sherfesee, p. 88-92.

Gardeners' chronicle, Aug. 21, 1915.—Forest trees in trenched and untrenched grounds by Vicary Gibbs, p. 111; "Witch broom" on willow, by A. D. Webster p. 123.

Journal of industrial and engineering chemistry, Sept., 1915.—A new native dye-wood; Robinia pseudacacia, by F. P. Dunnington, p. 806.

Journal of the Linnean society, Botany, May 15, 1915.—Structure of the wood of Himalayan junipers, by W. Rushton, p. 1-13.

National wool grower, Sept., 1915.—Grazing sheep on range without water, by J. T. Jardine, p. 7-10.

Nation's business, Sept. 15, 1915.—What is wrong with the lumber business, p. 13.

Nineteenth century and after, July, 1915.—Effect of six months' war on the timber supplies, by E. P. Stebbing, p. 204-17.

Philippine trade review, Aug., 1915.—Export timbers of the Philippines, p. 7-12.

Plant world, Aug., 1915.—The dunes of Lake Michigan, by Theo. J. Stomps, p. 205-16.

Scientific American, Sept. 4, 1915.—The war and lumber, p. 194.

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Southern planter, Sept., 1915.—Reclamation of gullied land, by R. C. Jones, p. 493-4. Technical world magazine, June, 1915.—To turn New York into a forest, by J. B. Bell, p. 457-9.

Trade journals and consular reports

American lumberman, Sept. 11, 1915.—Test wood for battleships; Forest products laboratory searching for material to use as backing for armor plate, p. 31; A visual method of distinguishing longleaf pine, by Arthur Koehler, p. 34-5; Silo preservatives that are safe, p. 50-1.

American lumberman, Sept. 18, 1915.—Failure of Tacoma bridge striking lesson, by Paul P. Whitham, p. 29; Wooden houses can be built to lessen fire risk, p. 32-3.

American lumberman, Sept. 25, 1915.—How to make a good shingle roof, p. 40-1; Describes extracting discovery, by Herbert Newton Crites, p. 53.

American lumberman, Oct. 2, 1915.—Profitable field for use of wood is presented; telegraph company can use millions of feet of creosoted wood ducts, p. 30-1.

Canada lumberman, Sept. 15, 1915.—Use of Douglas fir ably advocated, by J. R. Chamberlain, p. 27; Lumber and its interests at Canadian national exhibition, p. 32-4; Tool handles used in Great Britain, p. 34; The wooden pole market in England, by H. R. MacMillan, p. 35. Commercial importance of maple, by A. H. D. Ross, p. 36-7.

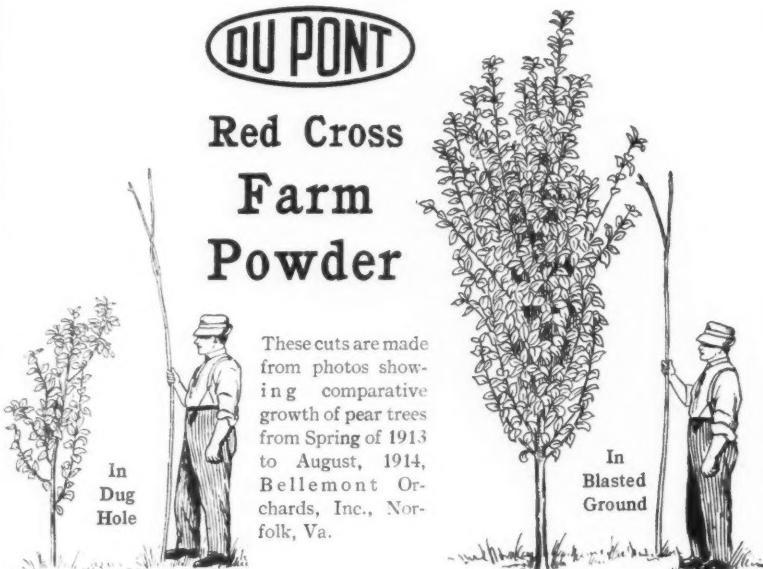
- Canada lumberman, Oct. 1, 1915.—Douglas fir markets in Great Britain, by H. R. MacMillan, p. 25-6.
- Engineering magazine, Oct., 1915.—Forests of the United States, by Leonard Lundgren, p. 1-17.
- Engineering news, Aug. 12, 1915.—Diagrams for cost of ties; Canadian Pacific railway, p. 292.
- Hardwood record, Oct. 10, 1915.—Changes in utilization of wood, p. 18-19; Amazon lumbering possibilities, p. 19; Records of large hardwood trees, p. 22-3.
- Lumber trade journal, Sept. 15, 1915.—Louisiana timber valuation raised, p. 11, 14, 19-25.
- Lumber world review, Sept. 25, 1915.—Problems in kiln drying lumber, by Harry D. Tiemann, p. 21-3.
- Mississippi Valley lumberman, Sept. 10, 1915.—The forests of New Zealand, p. 38-9; Increasing the efficiency of creosoted wood block pavements, by O. P. M. Goss, p. 59.
- Paper, Sept. 22, 1915.—Woodpulp for explosives, by Clayton Beadle, p. 14.
- Paper, Oct. 6, 1915.—Experimental work on soda cellulose; the diminishing of fuzz in soda pulp by proper cooking conditions, by Sidney D. Wells, p. 14-15; The dyestuff situation in the United States, by I. F. Stone, p. 16-17.
- Paper trade journal, Sept. 9, 1915.—Many uses found for waste timber, p. 44.
- Paper trade journal, Sept. 23, 1915.—Russia the world's timber yard, p. 46.
- Paper trade journal, Sept. 30, 1915.—Possibilities of accurate determination of ground wood in paper, by Max Cline, p. 50-2.
- Pulp and paper magazine, Sept. 1, 1915.—The manufacture of high grade sulphite pulp, by L. Wimmer, p. 156-8; The manufacture of yarns and textiles from paper pulp, p. 459-63.
- St. Louis lumberman, Sept. 15, 1915.—The wood silo vs. substitutes, by John B. Woods, p. 52-3; Creosoted pine block pavements, by F. P. Hamilton, p. 79.
- St. Louis lumberman, Oct. 1, 1915.—Silo exploitation, by J. Crow Taylor, p. 50-1.
- Savannah naval stores review, Sept. 11, 1915.—Saw mills are eating up the pine trees, p. 13, 18.
- Southern lumberman, Sept. 18, 1915.—The public interest in lumber trade extension, by E. A. Sterling, p. 29-30.
- Southern lumberman, Oct. 2, 1915.—Position of government in sale of timber explained, by W. B. Greeley, p. 23.
- Timber trades journal, Sept. 18, 1915.—An export sawmill in British East Africa, by F. E. Brown, p. 413; Mahogany industry of British Honduras, by W. D. Hornaday, p. 439.
- Timberman, Sept., 1915.—National forest timber sales, p. 25-6; Alaska forests, by H. S. Graves, p. 26; New Zealand forests and timber industry, p. 30-32; Legitimate field for structural timber, by Paul P. Whitham, p. 40; Modern skyline systems, p. 45-6; Uniformity in log

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- United States daily consular report, Sept. 16, 1915.—Algerian brier roots for pipe making, p. 1315.
- United States daily consular report, Sept. 25, 1915.—The lumber industry in Ecuador, p. 1458-9.
- United States daily consular report, Oct. 5, 1915.—Manufacture of paper and paper pulp in Indo-China, by Lawrence P. Briggs, p. 75.
- United States daily consular report, Oct. 8, 1915.—British market for wood-block paving, p. 120-1; Success of American woods in Greece, by A. B. Cooke, p. 127.
- West Coast lumberman, Sept. 15, 1915.—Destructive distillation yields of by-products from western conifers, by H. K. Benson and Marc Darrin, p. 24-5; Reports a permanent market for fir ties in United Kingdom markets, by H. R. MacMillan, p. 29-30.
- West Coast lumberman, Oct. 1, 1915.—Fir waste abounds in acetone; used as solvent in making war munitions, by Marc Darrin, p. 20; Report of government chemist on destructive distillation of fir waste, by George M. Hunt, p. 26-8.
- Wood turning, Sept., 1915.—The mechanical utilization of wood waste, by R. K. Helphenstine, p. 5-6; Manufacturing clothespins, p. 13.
- Wood turning, Oct., 1915.—White oak in demand; list of articles made of oak, p. 11-13.
- Woodworker, Sept., 1915.—New drying plant of Detroit lumber co., by A. Snedeker, p. 35-6; Best results in lumber drying, by L. A. McDonald, p. 36.
- Forest journals*
- Canadian forestry journal, Sept., 1915.—Guarding the lower Ottawa, p. 183-6; A model tree nursery, p. 187-9; Problem of slash disposal, by Clyde Leavitt, p. 195-7, 204-5.
- Forestry quarterly, Sept., 1915.—The regeneration of denuded areas in the Bighorn Mts. by Douglas fir, by Earl S. Peirce, p. 301-7; The artificial preservation of mine timbers, by Friedrich Moll, p. 308-16; A windfall problem, by George Y. Baker, p. 317-24; The progress of wood identification in the Philippine Islands, by E. E. Schneider, p. 325-32; Rules of thumb for volume determination, by Frederick R. Mason, p. 333-7; The Abney hand level and the chain on intensive forest surveys, by Clarence R. Anderson, p. 338-43; Hardwood planting in Owens valley, California, by Louis T. Larsen, p. 344-51; A blighted chestnut operation in New Jersey, by E. C. M. Richards, p. 352-60; Seed data on some secondary tree species, by E. A. Ziegler, p. 361-4.
- New Hampshire forestry, 1915.—The national forest in New England, p. 1, 3.

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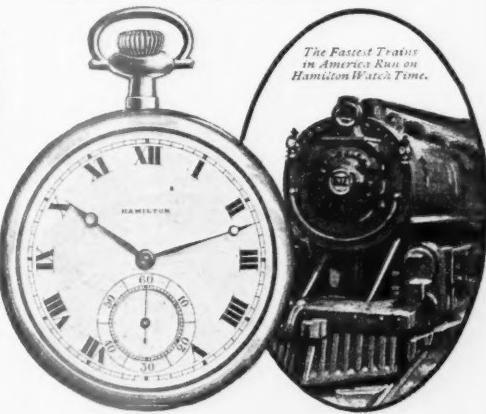
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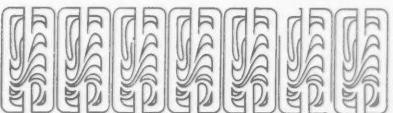
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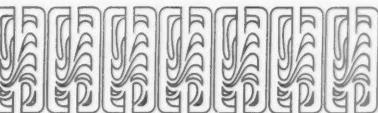
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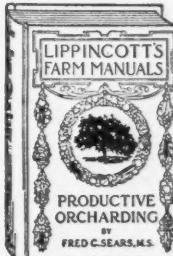
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